



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

MEMORANDUM

To: See Distribution
From: Mark Wissinger, P.E.
Construction Engineer
Date: August 25, 2003
Subject: Acceptance of Reinforced Concrete Products, and General Culvert Construction Considerations

As a result of reports from Districts and Construction Reviewers relating to an increase in the quantity of poor quality reinforced concrete boxes (RCB) and reinforced concrete pipe (RCP) being delivered to projects, Mac McArthur of the Construction Engineering Services Bureau gathered and summarized reports and photos from EPM's, Construction and Oversight Reviewers, and District Materials personnel. The purpose of this review was to quantify the extent and nature of the problem, identify areas of potential improvement in our acceptance of these products, and set out action items and the leads for these items that will be instituted to improve MDT's internal processes. After this was done MDT met with industry representatives to discuss our observations and corrective actions, and seek their input on the problems we had observed. The following are steps that MDT will take in response to the issues observed. The action items include inspection procedures with respect to pre-stressed concrete beams; beams were not specifically addressed in the afore mentioned review:

- The RCP, RCB and beam inspection reports will be reviewed to insure that they reflect the most current AASHTO specifications that govern acceptance. The forms will include an area for comments where the inspector at the plant will indicate observed defects that still fall within acceptance guidelines, or corrective actions taken to make them acceptable products. Billings District Materials Supervisor Bill Henning will take the lead on this item.
- The inspection sheet will be placed in pcommon in a Word format, and a message sent to the EPM for the project to receive the product, with the inspection report attached. Digital photos, if taken at the plant, will either be attached or placed in an accessible directory. Beam camber measurements are included on the beam inspection form, and will be sent out to the EPM and Bridge Bureau as soon as the project is done being poured. Billings District Materials Supervisor Bill Henning will establish this procedure. One supplier, Elk River Concrete, has indicated they will make computers available at both their Billings and Helena plants for this purpose.
- Defects that are noted in the plant inspection will be marked on the RCB, RCP or beam at the plant prior to shipment, as well as being noted in the inspection report. A standard method will be developed to stamp or otherwise indicate a particular product has been rejected, to prevent re-inspection or accidental shipment. Products will be stamped at a standard location. Bill Henning will take the lead on the item, developing a standard method for marking noted defects, and determining the most practical location to place stamps.

- A summary of governing AASHTO specifications will be developed and provided to field personnel charged with inspection and acceptance at the project site. Construction Reviewer Mark Baum will take the lead on this item.
- Pre-assembly and inspection of RCB sections and RCP with tie-bolt assemblies will be done at the plant prior to shipment. Elk River Concrete will provide a proposed procedure for the pre-assembly inspection. Kent Barnes, Materials Engineer, will approve the procedure.
- Inspection of materials will take place prior to placement on trucks for shipment.
- Help guides will be developed for RCP, RCB and steel culvert installations. We hope to have these help guides developed in time to be presented along with the culvert session planned for the training conference in January. Construction Engineering Services Engineer, Paul Jagoda is the lead on this item.
- Changes required to Specifications by the process changes will be identified and implemented by Lisa Durbin, Construction Administration Services Engineer.

The following issues were talked about in conjunction with the quality control issues previously noted. These points are for your general consideration:

- Any RCP greater than 900 mm (36") in diameter, and all RCB, are contract specific orders, meaning they are not generally kept in stock. For this reason it would be preferable to first stake, and confirm the lengths of, larger RCP and all RCB when possible. This would help reduce contract delays due to fabrication.
- The standard form length for RCB segments is 1800 mm (6'), and for RCP 2400 mm (8'). If there is not a safety, hydraulic, or other overriding issue that prevents doing so, we should try to stake and order pipe in these standard segment lengths.
- In steel, the longest lead-time required between ordering and delivery is for SSPP and SSPPA, which require approximately four weeks. Once again, if it is practical to do so, these installations should be staked first.
- CMP greater than 1350 mm (54") in diameter are match marked at the factory to assist in ease of installation.



I would like to thank all those who commented and sent pictures for the review. It is our hope that these steps will prove helpful. Please assist us in continuing to monitor the products and process to insure we are receiving what is required, and are communicating efficiently.



Montana Department of Transportation
PO Box 201001
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Construction Memorandum

To: Distribution

From:  Mark Wissinger, P.E.,
Construction Engineer 

Date: February 24, 2004

Subject: Advanced Construction Staking

This memo is to clarify the process to use to request advanced construction staking, and the criteria by which requests will be evaluated. This supercedes all prior memoranda on the subject.

Following is the procedure to be used when advanced construction staking is warranted on a project due to workload and/or project complexity.

- The District Construction Engineer is to send a request for advanced construction staking to the Construction Engineer, with a copy to the Construction Administration Services Engineer. The request may be made through a memo or an email, but must include the project information, the required manhours, and the anticipated staking start date.
- The Construction Engineer will review the request for completeness and project status. If the request is reasonable and there are no known issues with the project, the Construction Engineer will forward the request to the Preconstruction Engineer for review.
- The Preconstruction Engineer will review the request for project status and any known project delays. The results of the review will be sent to the Construction Engineer.
- The Construction Engineer will send a response to the advanced construction staking request to the District Construction Engineer, with copies to the Engineering Information Services Section and District Engineering Services Supervisor. A copy will also be sent to the FHWA Operations Engineer if the project is full federal oversight.

Some of the factors that will be considered by the Construction and Preconstruction Engineers when approving advanced construction staking requests include, but are not limited to:

- ✓ The project plans are complete and there are no anticipated changes that would affect the staking.

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- ✓ The staking will not be performed too far in advance of the letting date.
Generally, one to two months is acceptable for a medium size staking project, two to three months for a larger or more complex project.
- ✓ The stakes will endure weather, etc. until construction activities will likely begin (e.g. do not stake in the late fall for a project scheduled to be let in the spring.) It is recognized that the first, and more time consuming activity performed with the staking is the office preparation and the preparation of the grade runs and staking notes. If advanced construction staking is needed to perform this work, it should be described in the request and reflected in the manhours.
- ✓ No or minimal delays of the letting are anticipated due to right-of-way, utilities, railroad, etc.
- ✓ The project environmental document is complete.
- ✓ There are no right-of-way condemnations on the project.

All charges for construction staking made during the preliminary engineering phase of a project should be made to the appropriate survey activity number.

MAW:ld

copies: District Administrators
 District Construction Engineers
 District Engineering Services Supervisors
 James Walther, P.E.
 Carl Peil, P.E.
 Paul Ferry, P.E.
 Ron Williams, P.E.
 Joe Kolman, P.E.
 Tom Martin, P.E.
 Mark Wissinger, P.E.
 John Pirre
 Ben Juvan
 FHWA



*Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001*

Memorandum

To: Distribution

From: Matthew R. Strizich, PE Materials Engineer

Date: January 29, 2007


Subject: Buy America Data Base - Guardrail

The Buy America Database was created in an effort to track specific heats of guardrail being used on multiple projects. It increased awareness of required certifications both internally and within the industry, but the data has proven to be of limited use.

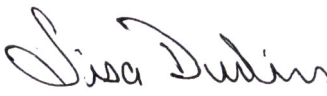
Effective immediately, entry of data into the Buy America Database for guardrail is no longer necessary. The existing information will be retained and the database will be available for reactivation if the need arises.

The work put into quickly creating and entering data into the database is appreciated. The effort was necessary and has proven effective in correcting a serious issue within our program.

Please direct any questions on this issue to Bob Kelly at 444-6162 or Scott Barnes at 444-6267.

	Montana Department of Transportation	Date Issued: March 31, 2008
CONSTRUCTION MEMO		Date Effective: March 27, 2008
		Related Specifications: 104.02
Subject: Change Orders		

To: Distribution

From: Lisa Durbin, P.E., 
Construction Administration Services Engineer

This memo rescinds and replaces the construction memo issued by Mark Wissinger on May 2, 2003. The concepts described within are applicable to all contracts, but the policy is specific to contracts being managed in SiteManager.

Definitions

Change Order Checklist

The change order checklist is a document that EPMs must use on each change order. Since “discussed with” dates are no longer being placed on the change order itself, the checklist is used to document the dates and names of people contacted. It is also a checklist for the EPM to ensure that all impacts are evaluated, such as the environmental document and programming document.

Emergency Approval

Emergency Approval is the situation under which work may be performed before approval of a change order. Emergency Approval will be reserved for conditions when a delay in the work would pose immediate danger to traffic or the general public, or if not performing the work would cause a delay that would result in damage to the project or adjacent property. Unless either of these conditions is present, Emergency Approval will not be granted. The Chief Engineer, Construction Engineer or Construction Administration Services Engineer may grant emergency approval. In their absence, the District Construction Engineer may grant emergency approval.

In SiteManager, work cannot be recorded against a new contract item until the change order is approved. Emergency approval allows the contractor to proceed with the work before the change order is approved. The EPM must document the work in a DWR or Diary remark. The “Emergency Approval” indicator is checked on the change order to indicate that approval was given. The EPM is encouraged to expedite the change order review and approval processes by increasing the change order discussions.

Override Approval Rules

SiteManager has a feature to override the approval rules. There are two scenarios where this feature may be used.

- The contractor refuses to sign the change order, but the Department needs to pay the contractor for work it has performed.
- Existing contract items must be moved from one category (split) to another. This may happen when an item is being taken over and paid for by a city or county, or FHWA is not participating in the cost of the item.

The only people that can override the approval rules include the Construction Engineer and the Construction Administration Services Engineer.

Significant Change

According to Subsection 104.02.3, a significant change is defined as ANY of the following:

- The character of the change differs materially from that involved or included in the contract.
- Major items change more than 25% in quantity.
- Non-major items change more than 50% in quantity.

If any of these occur, the EPM must evaluate the situation to determine if a price adjustment is warranted, positive or negative. Factors to consider in this evaluation include the bid history of the item for the as-constructed quantities, the complexity of the work (e.g. handwork), and how many fixed costs are included in the item, such as mobilization and overhead costs.

Change Order Phases

Change Order Discussion

Change order discussions are verbal discussions with other construction personnel and subject matter experts. They are required on all change orders to determine the need for a change, a preliminary scope and cost of the change, discuss federal eligibility, and to ensure consistency of changes statewide.

The EPM should call the DCE and/or DA, district construction reviewer, FHWA on full federal-oversight contracts, and other subject matter experts to finalize the scope of the change. If the size or scope of the change is significant, the Construction Engineer and the Construction Administration Services Engineer should also be contacted. If the contract is designed by a consultant, Consultant Design should be contacted at this stage so they can determine if the change falls under errors & omissions.

Change Order Review

When a change is identified, the EPM will create a change order in SiteManager. As the scope is identified, and the items and time are negotiated with the contractor, these items are added to the change order.

When the change order information is complete, the EPM uses the “Forward To” function in SiteManager to send it out for review. The draft change order is sent to the reviewers, including Preconstruction personnel, attached to an email. SiteManager reviewers enter their comments in SiteManager. Non-SiteManager users send comments to the EPM (which is indicated on the draft change order). All personnel are encouraged to call and discuss the change with the EPM or others.

Change Order Approval

Change order reviewers have four days to send comments to the EPM on a change order. If additional information or discussion is needed, they should send an email to the EPM, with a copy to the DCE, to inform them of this so they do not start the change order approval process.

If all reviewers approve the change order or no comments are received within four days, the EPM receives an email reminder and changes the status of the change order to pending. This begins the approval process. The EPM approves the change order, prints the pending change order report and gives it to the contractor to sign. When it is returned from the contractor, the EPM enters the contractor approval in SiteManager, and the remaining individuals approve the change order. When all required electronic signatures are entered in SiteManager, the change order is approved. New work items can be recorded and paid for at that time.

Change Order Authority

The approval of the change order is dependent on the dollar value and/or amount of time adjustment. The EPM approves all change orders. The DCE has authority to approve change orders with a value up to \$50,000 or that add up to 5 days of contract time. If either of those numbers are exceeded, the change order must also be approved by the DA and the Construction Administration Services Engineer.

In SiteManager, these are known as the approval rules. As mentioned above, the only people that can override these rules are the Construction Engineer and the Construction Administration Services Engineer. If this is required, the EPM contacts one of these individuals. They change the status of the change order to pending and select the approval names. The same Department personnel are selected as the typical approval rules. The only difference is that the contractor role is omitted. When the EPM approves the change order, they add a comment in SiteManager that “The contractor refused to sign the change order.” or “Change in funding only.” whichever is applicable.

Change Order Content

Header

This contains summary information of the change order, including the reason code of the change order, the change order function (e.g. overrun), and the change order amount.

The change order status is also changed in this window.

Work Items

All changes to work items are included here, whether existing quantities are increased or decreased, or new contract items are added. The EPM must include all items associated with the change (e.g. traffic control, erosion control, etc.). This is to present an accurate total impact of the change.

If the item is new to the contract, the EPM must evaluate the price to ensure it is fair, reasonable and equitable. The EPM can request additional information from the contractor, but should evaluate it independently. One of the most useful tools is the Bid History tool in Oracle. It allows the EPM to view historical data on projects in the same district or statewide, and allows them to evaluate the price based on similar quantities. Recognize that, because the item is added by change order, it will usually cost a little more than if the item were included in the original contract.

Explanations

This is a description of the contract change. The EPM can use a standard explanation, if applicable. Multiple explanations can be entered in SiteManager, and all are displayed on the change order. So, the explanation can consist of a standard explanation and a short custom explanation to describe additional information.

“Discussion dates” will not be entered in the explanations.

Time Extension

Contract time is adjusted here, whether the contract time is in days or is a specified completion date. Time can be increased or decreased. If time is adjusted, the Time Adjustment function must be checked on the header window.

The “money formula” is no longer in the specifications. Time is a negotiated item, similar to a new contract item. The approval of additional contract time should be based on an updated schedule from the contractor.

Change Order Reasons

Change orders must be completed for the following reasons:

- A new item of work is added to the contract.
- The requirements of the contract change (e.g. a special provision is updated, a specification is deleted, the typical depth is changed, etc.).
- A price adjustment is applied to an item.
- Contract time is added or deleted.
- A major item overruns/underruns more than 25%.
- A non-major item overruns/underruns more than 999%. *
- An item overruns more than \$75,000.
- The value of miscellaneous work used on an item of work exceeds \$30,000.
- The project limits are changed.
- A change in the controlled access.
- The Notice to Proceed is changed. This does not apply to flex time contracts.

* Item overruns can create “discrepancies” in SiteManager. If the specification allowance of 50% were used in SiteManager, it would result in change orders for very small dollar amounts since price adjustments only apply to the quantity over 150%. If a non-major item overruns/underruns more than 50% but less than 999%, the EPM must evaluate it to determine whether or not a price adjustment is appropriate. If it is, a change order is required.

Change orders are not required for incentives and disincentives, including those associated with contract time, and fuel or asphalt adjustments. These are accomplished with a line item adjustment, not a reduction in quantity.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: January 20, 2006

Subject: Compaction Summaries

This Construction Memo provides guidance for the uniform use and processing of Field Compaction Summaries.

Submit a copy of the Embankment and Excavation Compaction Summary of Test Data form and Surfacing Compaction Summary of Test Data form to the District's Construction Engineering Services (CES) Reviewer. The original form is to be signed at the bottom by the Engineering Project Manager (EPM) and forward to the District Materials Supervisor (DMS) for review and signature. Keep copies in the project file. The DMS will retain a copy of all summaries and forward the originals to the Materials Bureau. Submit the compaction summaries for each category (i.e. original ground, embankment, finish cut, culvert, etc.) on a weekly basis whether the form is completely filled out or not.


The Construction Engineering Services Bureau and the District Materials Supervisor will review these compaction summaries. This will allow issues to be addressed in a timely fashion and provide for the required project documentation.

Submit all original individual field test documentation to the Materials Bureau through the District Materials Supervisor prior to project closeout. Copies of these tests must be retained in the project file and District Lab.

All original compaction summaries and individual field tests will be on file in the Materials Bureau.

For assistance or questions related to this subject, please contact the District's Construction Engineering Services Reviewer or myself.

This memo supersedes any previous memos on this subject.

	Montana Department of Transportation	Date Issued: July 14, 2008
CONSTRUCTION MEMO		Date Effective: July 14, 2008
		Related Specifications: N.A.
Subject: Construction Detours – MCS Over-width Permits		

To: Distribution

From: Kevin Christensen, P.E.
Construction Engineer

This is a reminder to make the necessary notification to Motor Carrier Services (MCS) for construction detours (this includes four lane to two lane detours on the Interstate system) any time a project will result in a detour of oversize loads.

When placing width restrictions on any particular segment of highway the MCS permit office must be afforded at least 10 days notice. If such a restriction is the result of an emergency, then do your best to advise the MCS office as soon as possible.

MDT issues over width permits on an annual basis up to 15 feet wide, in addition to all the permits issued daily from the MCS office and on the computer system. Advanced notice is required to alert the MCS offices, scales, annual permit holders and to update the web page. If we are successful in giving MCS lead time we will reduce the complications caused when a wide load enters a restricted area and greatly reduce the number of complaints received.

The following are MCS Contacts in Priority order. These are **INTERNAL** Phone Numbers Only

Tom Winfield	444-0816
Dan Kiely	444-7629
Mark Moberly	444-6139
Dennis Sheehy	444-6140

PUBLIC NUMBER 444-7638



Montana Department of Transportation
PO Box 201001
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Memorandum

To: District Construction Engineers

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: July 31, 2007

Subject: Construction Jobsite Safety

This construction memo provides guidance for jobsite safety. According to MDT Standard Specifications and individual project contracts, the contractor is solely responsible for the safety of its employees and for following OSHA regulations. However, if an MDT employee sees what is known to be an unsafe situation, they will take some action to prevent injury.

1. The MDT employee should bring the apparent safety infraction to the attention of the individual involved.
2. If the issue is not resolved, or it continues, the individual's supervisor should be notified, followed by notifying the project Superintendent in writing.
3. If a solution is still not reached, the EPM has the authority under Subsection 105.01.A.1 to suspend work wholly or in part, depending on the situation, to correct the unsafe working conditions. At this point, the contractor's Superintendent must be notified to correct the situation. It is their responsibility to know and follow OSHA regulations relevant to the methods of work which the contractor has chosen.
4. OSHA should be contacted if MDT personnel see a consistently reoccurring unsafe practice. The suspected infraction should be explained to an OSHA representative, and if they too feel that the working conditions are in violation of OSHA regulations, they will inspect the job site themselves as per 107.01.

If the practices are unsafe according to OSHA regulations, the contractor, and not MDT, will be held responsible for any damages, fines, penalties, etc.

MONTANA DEPARTMENT OF TRANSPORTATION
HELENA, MONTANA 59620-1001

MEMORANDUM

TO: District Construction Engineers

FROM: Kevin Christensen,
Construction Engineer

DATE: June 14, 2007

SUBJECT: Construction Memo: Trailer Move Procedures

The following procedures have been developed to assist in the preparation of moving construction trailers in order to ensure connectivity needs are met in a timely manner. These procedures cover network/phone connectivity, power, security, and water/sewer.

1. Disconnect only
 - a. Notify MDT ISD Systems and MDT Radio Outlook distribution lists 30 days prior to the disconnect date.
 - b. Provide contact name, contact phone number, physical address, and network or DSL connections to be disconnected.
 - c. Notify the local district office personnel responsible for phone and fax numbers, of disconnect needs.
2. Disconnect and Reconnect in a new location OR Reconnect Only
 - a. Schedule a meeting and/or phone conference with DOA, ITSD & MDT personnel 60 days in advance to discuss options for network and phone connectivity. This research will assist in determining the best location to meet connectivity needs. Individuals to include in the meeting are the DOA ITSD & MDT Networking Team Outlook distribution list and appropriate district personnel.
 - b. Once the new location is determined, notify MDT ISD Systems and MDT Radio Outlook distribution lists 60-90 days prior to the disconnect/reconnect date. (Includes research time, circuit order and disconnect/reconnect service).
 - c. Provide contact name, phone number, disconnect physical address (old location), network or DSL connections to be disconnected, date trailer will be relocated, reconnect physical address (new location), phone number (new location), network and/or DSL connections to be installed and legal description (in some cases township, range and section is needed).
 - d. Notify local office personnel responsible for phone and fax numbers, of disconnect or re-connect needs.

- e. If a phone connection does not exist in the new location, contact the local office personnel to order the phone service. If personnel do not have authority in their area to request the new phone service, contact Kevin Bruski or Gary Vauthier in MDT Communications for assistance.
- f. Miscellaneous installation items can be requested by the District Financial Officer or the AAA Area Admin Assistant:
 - i. Power pedestals – hooking up and hiring and electrician if needed.
 - ii. Security fence and gate.
 - iii. Propane tank.
 - iv. Sewer and/or water hookup.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Kevin Christensen, P.E.
Construction Engineer

Date: June 25, 2007

Subject: Contractor Relations and Access to MDT Test Trailers and Laboratories

This memo replaces the previous memo on the subject of Contractor Relations dated December 8, 2005.


In order to reduce confusion and promote uniformity in contract administration throughout the state, this memo provides guidelines for the distribution of information and to address contractor access to MDT test trailers and laboratories. While this memo is primarily directed towards Project Managers, it provides guidelines that should be used by all district personnel.

Contractually the contractor is responsible for Quality Control of the products placed on construction projects. Conversely we are responsible for Quality Assurance testing. Quality Assurance testing includes Plant Mix Surfacing volumetrics and density testing of cores. The results from all testing used to assess incentive and disincentives should be shared with the contractor as soon as possible so that they can make adjustments to their Quality Control Plan.

Although we have no contractual obligation requiring us to give contractors access to our test trailers or laboratories, reasonable access should be granted to ask or answer questions and/or obtain test results. However, the contractor or their representatives are not allowed to continually stay in our test trailers or laboratories. Observation of test procedures must be scheduled thru the EPM and District Lab Supervisor.

Under no circumstances should the contractor have access to our computers, offices or laboratories without MDT personnel being present. Do not allow the contractor to run any QA testing, use MDT lab equipment, enter data, or change any data in the project computer. If the contractor requests a copy of the completed testing, have them provide a disk for this purpose.

Please contact me if you require additional information.

 <p>Montana Department of Transportation</p> <p>CONSTRUCTION MEMO</p>	Date Issued: June 24, 2008
	Date Effective: June 24, 2008
	Related Specifications: 709.02
Subject: Corrugated Steel Pipe Inspection	

To: Distribution

From: Matthew R. Strizich, P.E. 
Materials Engineer

Roscoe Steel has relocated their manufacturing of Corrugated Steel Pipe (CSP) culverts smaller than 60 inches (diameter) from their Billings facility to a facility in Casper, WY. Because of this move, MDT Materials personnel or MDT representatives will no longer be inspecting most CSP before it arrives on jobsites (i.e. no "Circle M" stamp.) The material will now need to be accepted in the field based on proper documentation and visual inspection whenever it has not been previously inspected at the point of manufacture. As a result, engineering field personnel will now be responsible for collecting necessary paperwork, including certification (Buy America and galvanization or spelter) and required forms. Visual inspections of the heat number, size, manufacture, condition, etc. on all CSP not previously inspected at the point of manufacture are also required.

The following items need to be received and checked for compliance with contractual requirements whenever a CSP has not been inspected at the point of manufacture. If all contract requirements are met, the documentation should be attached to a completed Form 46 and submitted to the Materials Bureau, through the District lab.

Form 406
Mill Test Report
Certifications covering the manufacturing processes and Buy America

If there are questions regarding the required documentation or visual inspection please contact Anson Moffett at 444-5407 or Bill Henning at 255-0128

If there are questions regarding Buy America, please contact your District Buy America Specialist or Bob Kelly at 444-6162.

Distribution: Kevin Christensen, P.E. – MDT Construction Engineer
Paul Jagoda, P.E. – CES Engineer
R. Scott Barnes, P.E. – Testing Engineer
Ross "Oak" Metcalfe, P.E. – Testing Operations Engineer
District Materials Supervisors
Area Lab Supervisors
District Buy America Experts
District Construction Engineers
Engineering Project Managers
Construction Engineering Services
Anson Moffet, P.E. – Materials Bureau QA/QC Engineer
Bob Kelly – Steel Fabrication Specialist
Mitzi Huft – Materials Lab Specialist



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark Wissinger, P.E.
Construction Engineer

Date: December 28, 2005

Subject: Crosshole Sonic Logging Testing Requirements

The purpose of this Construction Memo is to guide Project Managers in the determination of when to perform Crosshole Sonic Logging. This memo rescinds and replaces applicable sections within the Construction Manual.

The Drilled Shaft Special Provision requires CSL testing of the first shaft. The contractor is not required to wait for the results of the CSL in order to proceed with the construction of subsequent shafts. The Engineering Project Manager can also require additional testing of additional shafts.

At the minimum, CSL testing should be performed:

1. On at least one shaft per bent. The first shaft constructed generally would be preferred.
2. Whenever there is concern that a shaft could have a defect based on construction observations, concrete mix problems, or other reasons based on the engineering judgment of the Engineering Project Manager.
3. The first shaft poured using altered procedures or construction techniques allowed based on an approved Change Order. (ie., a contractor submitted new procedure, which varies from the Drilled Shaft Special Provision, but approved by Change Order). Deviation from the contract without a Change Order is not allowed.

CSL tubes should be placed so that they extend all the way to the bottom of the shaft. Placing CSL tubes above the bottom of the drilled shaft excavation prevents CSL testing at the most important area of the shaft.

Ensure that the temporary caps on the tops of the tubes are securely fastened so that debris or concrete does not enter the tube.

CSB Crosshole Sonic Logging Testing Requirements



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Matthew R. Strizich, P.E.
Materials Engineer

Date: October 3, 2006

Subject: Density Acceptance by Cores

This Construction Memo provides guidance for the uniform administration of the Density Acceptance by Cores provisions.

Recently there have been numerous instances where requirements outlined in the Density Acceptance by Cores specifications have been ignored by the contractor. Violations include cutting cores to partial depth of the lift thickness and rolling of the area to be tested once all rolling was supposed to be complete. If these violations occur under a current contract the EPM needs to issue an immediate shutdown notice for all paving operations. The shutdown should remain in effect until the issues are resolved to the satisfaction of the EPM. Deal with the improperly taken cores on a case-by-case basis.

To help avoid issues with identifying the lift line location, MDT inspectors need to mark cores on the lift line and ensure the contractor cuts the core as closely as possible to the mark. The new specials define as closely as possible to be within 4 mm. Trimming of loose gravel from the first lift of plant mix over a gravel surfacing is allowed to a depth approved by the EPM.

The revised versions of the Grade S Volumetric, Grade S Non-volumetric, and Grade D Commercial Special Provisions provide a process for dealing with these issues in the future. These revised specials will be included in all jobs starting with the November 2006 letting and will not require an immediate shutdown.

For assistance or questions related to this, please contact the District's Construction Engineering Services Reviewer.

Density Acceptance by Cores



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark Wissinger, P.E.
Construction Engineer

Date: August 22, 2003

Subject: Density Acceptance on Pulverized Plant Mix Surfacing

On June 13, 2003 a revised Pavement Pulverization special provision was submitted to the Contract Plans Bureau (see attachment). The purpose of this Construction Memo is to clarify and provide instructions on in-place density testing and density acceptance of pulverized plant mix surfacing.

In-Place Pulverized Plant Mix is normally a non-uniform material. The non-uniformity is caused by the changing ratios of virgin aggregate and pulverized plant mix material.

As per the Pavement Pulverization Special Provision, MT-219 is the method to be used to develop the target density. In order to help this process one point proctors are to be run while the pulverization is in progress. A one-point proctor will provide current moisture content, identify physical changes in the material, and confirm the density control standard. A running average of one-point proctors will also identify when the control density should be adjusted. At this time the sampling frequency of the one-point proctors will be left to the inspector's judgment. It is suggested that a one-point proctor be run every 4,000 feet (1,220m) or minimum of one, one-point proctor per day.

Along with density control, identifying the correct moisture content is important. Methods to help determine moisture content are oven-dried moisture tests and correcting the nuclear gauge moisture reading, using the moisture off-set mode. Enter the oven-dried moisture content into the nuclear device, using the moisture off-set mode. Follow the moisture-offset instructions in the user manual for the model of the nuclear gauge being used.

The one-point proctor test procedure described above is similar to the testing methods used to control moisture/density when placing Cement Treated Base (see Subsection 304.03.6 and MT-216).

Density Acceptance on Pulverized Plant Mix Surfacing

The Pavement Pulverization special provision was written to address two different construction processes that may exist when using pulverized plant mix material to construct a base.

1. Pulverized In-Place (non-pugmilled)

This material is normally non-uniform with varying thickness and types of existing plant mix being mixed with underlying base course materials. This creates a material with varying percentages of pulverized plant mix and base course. Depending on the planned profile of the new roadway additional crushed aggregate course may be added to raise the grade. Other variables are the lowering of the grade, moisture contents, maintenance patch areas, and super elevation areas where the percent of pulverized material will vary widely with relation to the centerline. The standard method for attaining the target density in these situations is the Control Strip Method (MT-219).

2. Pugmilled Pulverized Material

The ratio of pulverized material, crushed base aggregate, and moisture is normally more uniform than in-place pulverized material. The existing plant mix surface is pulverized, picked up, transported to the pugmill, ran through the pugmill, then taken back to the roadway and placed. This process is very similar to our Crushed Aggregate Course (Crushed Base Course) process. The standard method for density acceptance is the proctor method.

When using the Control Strip Method (MT-219) to determine a target density:

- Assure MT-219 is followed.
- Document the attainment of the target density by plotting the dry density verses the number of roller passes on a chart.
- If the plotted curve does not break, chances are the roller being used is not heavy enough.
- A new target density must be established by a new Control-Strip if:
 - The ratio of pulverized material and Crushed Aggregate Course change significantly, or the Engineer determines the pulverized material characteristics or site conditions change. A significant change would be a ratio change of 20 percent or greater.
 - A different roller is used.
 - A different nuclear device is used.
 - Aggregate characteristics change appreciably.
 - Aggregate is produced from another source.
 - Each new lift.

Attachment

1. PAVEMENT PULVERIZATION (Revised 6-13-03)

A. Description. Pulverization consists of processing the existing plant mix surfacing and adding Crushed Aggregate Course material necessary to restore the roadway section. Construction.

Pulverize the bituminous surfacing to the full depth of the existing mat. The existing plant mix depths on the project are as follows:

<u>From</u>	<u>To</u>	<u>Average Width</u>	<u>Depth</u>
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Pulverize the existing bituminous material so that 100% by weight passes a 2-inch (50 mm) sieve. Equipment used to pulverize the existing surfacing must not reduce the aggregate size in the existing surfacing.

Furnish Crushed Aggregate Course meeting the requirements of Subsection 701.02.1 and one of the following:

Crushed Aggregate Course Type "A" Grade 5 Subsection 701.02.4

Crushed Aggregate Course Type "A" Grade 6 Subsection 701.02.4

Add Crushed Aggregate Course as necessary to construct the roadway to the dimensions shown on the typical sections. Uniformly mix the pulverized material and crushed aggregate course using the pulverization equipment.

Rescind and replace subsection 301.03.5.D with the following:

Compact the pulverized mixture to 98 percent of the target density.

The target density will be determined by one of the following methods:

1) When pulverized plant mix and Crushed Aggregate Course are blended at a constant ratio by pugmill, maximum density will be determined by MT 230. The initial target density is the average of the maximum density of at least two tests on samples representing the material to be compacted.

2) . When in-place (non-pugmilled) pulverized plant mix and Crushed Aggregate Course mixtures are combined at varying ratios, maximum density is determined by MT 219.

Target densities and moisture corrections will be established by the Project Manager. A new target density will be established if the ratio of pulverized material and Crushed Aggregate Course change by more than 20 percent or the Engineer determines the pulverized material characteristics or site conditions change.

Each lift of pulverized mixture material will be divided into 2000-foot long (610 m) sections. The in-place dry density of each lift will be determined within each section at 10 randomly selected locations. The average of the 10 tests must exceed 98 percent of the target with not more than 2 out of the 10 tests being less than 98 percent of the target.

Be responsible for controlling compaction and all necessary control testing.

Notify the Project Manager once compaction is complete on a section so it may be tested.

Re-compact sections not meeting density requirements.

Re-compacted sections will be tested at 10 new random locations.

Compaction and testing will continue until the section meets density requirements.

B. Measurement and Payment. Measurement and payment for Crushed Aggregate Course will be by the ton in accordance with the Standard Specifications.

Measurement for pavement pulverization will be by the square yard (square meter). If the average pavement depth varies by more than 0.10 foot (30 millimeters) from plan, the pulverization quantity will be adjusted by the ratio of the actual pavement depth in excess of 0.10 foot (30 millimeters) divided by the plan depth. Payment will be at the contract price per square yard (square meter) of pavement pulverization and is full compensation for pulverizing, mixing, placing, compacting and any other work required to complete this item.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark Wissinger, P.E.
Construction Engineer

Date: December 28, 2005

Subject: Drilled Shaft Submittals

The purpose of this Construction Memo is to guide Project Managers concerning contractor submittals for drilled shaft construction. This memo rescinds and replaces applicable sections within the Construction Manual.

The Drilled Shaft Special Provision requires that the contractor submit to the EPM an outline of the methods and procedures that will be used to construct the shaft. The EPM should review the submittal to ensure that it does not conflict with the contract, paying special attention to the Drilled Shaft Special Provision.

In particular:

CSL tubes should be placed so that they extend all the way to the bottom of the shaft. Placing CSL tubes above the bottom of the drilled shaft excavation prevents CSL testing at the most important area of the shaft.

Temporary casing should be placed all the way to the bottom of the drilled shaft. Most drilled shaft designs rely on significant end bearing in addition to side friction. The risk of caving or sloughing at the toe can only be reduced if the temporary casing is placed to the bottom of the excavation.

The temporary casing should be withdrawn during the pour as outlined in the Special Provision. Waiting to remove the casing until concrete placement is completed can result in temporary casings becoming stuck in the drilled shaft excavation, preventing their withdrawal.

Contractor requests to deviate from the specifications require prior written approval by MDT and may result in a Change Order. Do not permit deviations from the contract requirements. Deviation from the contract is cause for a stop work order.

Contractor requests to deviate from the approved submittal require that the new procedure be resubmitted and approved. Deviation from an approved procedure is also cause for a stop work order.

CSB_Drilled_Shfts_Submittals

The EPM should forward copies of the Contractor's Drilled Shaft Submittal to the following functional units for review:

Geotechnical Section
Bridge Bureau
CES Bureau Bridge Reviewer

Do not allow construction of the drilled shaft to begin until the submittal has been reviewed and determined to be in accordance with the specifications.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Paul Jagoda, P.E. *PJ*
Construction Engineering Services Engineer

Date: December 11, 2003

Subject: Process for Estimating Earthwork Quantities For Progress Estimates

This Construction Memo develops a uniform process for the estimating of pay quantities for earthwork quantities to be used in the monthly estimates.

To provide uniformity follow these guidelines, in order of preference:

Unclassified - Excavation

1. Calculate a percentage of the earthwork using the computer earthwork run.
2. Load counts.
3. Average widths and depths of the earthwork.
4. Using the earthwork balances and mass diagrams (percentage of plan).

Reference the following specifications:

109.06 & Supplemental Specification
109.08 & Supplemental Specification
203.04.5 & Supplemental Specification
Construction Manual Page 2-39

Borrow Measured in Borrow Area

1. Survey of borrow pit each month.
2. Calculate a percentage of the earthwork using the computer run.
3. Load Counts.
4. Average widths and depths of the earthwork.
5. Using the earthwork balances and mass diagrams (percentage of plan).

Reference the following specifications:

109.06 & Supplemental Specification
109.08 & Supplemental Specification
203.03.1E

Borrow Measured In Place)

- Computer Runs, i.e. Typical Transition And Vertical Alignment Program
Cross Sections and/or width and depth measurements to be used as final records.
2. Load Counts.

Using the earthwork balances and mass diagrams (percentage of plan).

Reference the following specifications:

109.06 & Supplemental Specification

109.08 & Supplement Specification

Embankment In Place

1. Calculate a percentage of the earthwork using the computer earthwork run.
2. Load counts.
3. Average widths and depths of the earthwork.

Reference the following specifications:

109.06 & Supplemental Specification

109.08 & Supplemental Specification

203.04.3 & Supplemental Specification

203.04.5

Muck Excavation & Sub – Excavation

Cross Section.

2. Average Width and depth.
3. Load count.

Reference the following specifications:

109.06 & Supplemental Specification

109.08 & Supplemental Specification

203.01.1E

203.01.1F

Notes:

The process used is project specific and to be determined by the EPM.

A combination of the above items may be used dependant on contractor's operation.

The process used is to be clear and well documented and be easily followed by others.

The total quantity of earthwork is not to be paid for until all the work involved in that type of earthwork is completed, to include sloping, finishing, ditches, topsoil placement, etc. Therefore, a typical rate of 5% of earthwork quantity should not be placed on the estimate until all the earthwork is completed according to the specifications and plans.

- It is recognized that compaction testing/summaries may be performed after the section has been paid if the area had to be reworked due to weather, winter maintenance, truck damage, etc.

As items near completion, estimated quantities need to be computed in final pay documentation in order to avoid overpayment.

**Once the entire earthwork is completed and the quantities finalized and checked, overpayments/underpayments will be paid/modified on the next estimate.
Reference 109.10.**

PJ/JH/jh


CC:	Mark Wissinger, PE	Joel Marshik, PE	Jim Walther, PE	Paul Ferry, PE
	Lisa Durbin, PE	CES Bureau	EPMs	DAs
	District Office Engineers	Dennis Sheehy	FHWA Op. Engs.	Ted Burch, FHWA



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark Wissinger, P.E., Construction Engineer 

Date: June 12, 2006

Subject: Construction Memo – Subsection 102.06 Examination of Documents and Site of Work

The purpose of this Construction Memo is to formally establish the notification processes required by Subsection 102.06, and how the Department's Q & A Forum and addendum process work in conjunction with this specification.

The Q & A Forum opens at 5 pm on the evening of the advertisement date, and closes to the asking of questions at 10 am on the Friday before the bid opening. Subsection 102.06 contains the following requirement: "Upon discovery, immediately notify the Engineer in writing if an error, omission, or ambiguity exists and why it appears erroneous, omitted, or ambiguous." Until the Q & A Forum closes at 10 am on the Friday before the bid opening, the Q & A Forum is the preferred method for the contractor to ask in writing about perceived errors, omissions, or ambiguities within the contract package. Some important points to remember about the written notice requirement;

- In order to preserve the integrity of the bid process, all parties must be aware of questions asked about the advertised contract package. Refer any party outside of the Department asking questions to the Q & A Forum.
- Do not answer questions posed by any party outside of the Q & A Forum. Inform the party asking the question that the specification requires the question be asked in writing, and the question, along with the Department's response, will be posted on the Q & A Forum.
- Monitor the Q & A Forum throughout the course of the advertisement. Document and forward any questions raised outside the Q & A Forum to the Contract Plans Bureau. The Contract Plans Bureau will post the question (including the name and organization of the party asking the question) and a clarification or addendum as needed.
- The assigned Design Project Manager must be made aware of any question raised during the advertisement period. This is particularly true of a consultant designed project, where the consultant must be given the opportunity to correct errors, omissions and ambiguities before the bid opening.

The contract makes contractors submitting bids responsible for incorporating into their bid the information posted on Q & A Forum up until 5 pm on the evening before the bid opening. The specification does not specifically state how written notice by the contractor is to take place

CSB102_06(Examin Docs and Site 6-12-06)

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between the closing of the Q & A Forum to the asking of questions by the contractor and the opening of bids. The following is the process to be followed during this time period;


- Do not answer any question asked outside of the Q & A Forum. Tell the party asking the question that their question, and the Department's response will be posted on the Q & A Forum, if it is still open. If the Q & A Forum is closed, refer the party asking the question directly to the District Construction Engineer.
- Remind the party asking the question of the specification requirement to ask for the clarification in writing. The request for clarification should be sent to the District Construction Engineer and Contract Plans Engineer. It is preferred that the written request be made via e-mail, if available, due to higher print quality, but fax is an option as well.
- Immediately notify the District Construction Engineer that a question has been asked outside of the Q & A Forum. Provide the District Construction Engineer with the written request for clarification. If the party asking for clarification refuses to put the request in writing, provide the District Construction Engineer with the question asked, the name of the party asking the question, and the organization they represent.
- The District Construction Engineer will make the initial determination of the scope of the question.
- In the event that the District Construction Engineer determines the question is minor in scope, and the Q & A forum is still open, the District Construction Engineer will coordinate issuance of clarification and/or addendum through the Contract Plans Bureau and Design Project Manager.
- In the event that the Q & A forum is closed, or the District Construction Engineer determines the question is major in scope, the District Construction Engineer will contact the District Administrator, Chief Engineer, Contract Plans Engineer and Construction Engineer.
- The Chief Engineer will determine the course of action, such as; issuance of a clarification or addendum, extension of the advertisement, or pulling the project from the letting.

The advent of the Q & A Forum and late addendums which may be issued up to 48 hours before the bid opening, has provided the Department with more flexible options to clarify or address apparent errors, omissions or ambiguities in advertised contract packages. These processes have been helpful in restoring and preserving the integrity of the competitive bid process. In order to ensure that these benefits continue, the practices established must be rigorously followed.

copies: FHWA
District Administrators
District Construction Engineers
District Construction Operations Engineers
Engineering Project Managers
Construction Administration Services Bureau
Construction Engineering Services Bureau
Contract Plans Bureau

CSB102_06(Examin Docs and Site 6-12-06)

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	Montana Department of Transportation	Date Issued: 5/9/08
CONSTRUCTION MEMO		Date Effective: 5/9/08
		Related Specifications: 105.15.3 106.01.2
Subject: Final Materials Certification Process		


To: Distribution

From: Matthew R. Strizich, P.E. 
Materials Engineer

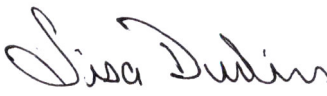
Generating the final materials certification is a process that should take 90 days from the signing of the Final Inspection form (substantial work completion date). This is not happening on most projects and in many cases is holding up final project closeout. Outlined below are some minor procedural changes to help ensure the process is completed in the required time frame.

- The Materials Bureau will send Form 1005-B Request for Materials Documentation within two weeks of receiving a copy of the Final Inspection form from the EPM.
- The EPM will send all electronic correspondence and hard copies supplied in response to the deficiencies identified on Form 1005-B to the DMS within 45 calendar days.
- The DMS will collect and track the information supplied by the EPM until all items listed on Form 1005-B have been received.
- Once all information requested has been received, the DMS will send the compiled information as 1 packet to the Certification Compliance Specialist (currently Mitzi Huft) in the Materials Bureau.
- The DMS will send a memo to the District Construction Engineer listing all outstanding items if the lab has not received all the information listed on the Form 1005-B within 45 calendar days of it being issued. The DMS will send copies of the memo to the EPM and the Materials Bureau.

If you have questions on these changes, please call Matt Strizich at 444-6297 or Scott Barnes at 444-6267.

	Montana Department of Transportation	Date Issued: May 6, 2008
CONSTRUCTION MEMO		Date Effective: March 27, 2008
		Related Specifications: 105.15.2, 105.15.3, 109.08
Subject: Final Payment Process		

To: Distribution

From: Lisa Durbin, P.E., 
Construction Administration Services Engineer

Updated information has been posted to explain the general process for completing the contract final and generating the final estimate and payment. Included is a diagram of the key events and dates and an outline of the process. There is a version for the existing system (PECOS), and a slightly modified version to show the differences in SiteManager. These documents can be found under Manuals, Guidelines and Catalogs > Contracting/Consulting at:

<http://www.mdt.mt.gov/publications/manuals.shtml>

This procedure reflects revisions incorporated into Supplemental Specifications 105.15 and 109.08. These specifications were updated to clarify that a contract is not finally accepted until it is accepted by the Commission, as well as to clarify the issue of project warranties. The Supplemental Specifications will be effective with the June 2008 letting. Supplemental Specifications can be found on the Contracting/Consulting webpage:


ftp://ftp.mdt.mt.gov/contract/stdspec_sup_new.pdf

The revised Final Inspection form, CSB105_15_2 and the revised Contractor's Request for Acceptance form, CSB105_15_3 are also available on the Contractor's System website.

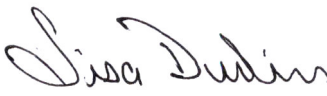
http://www.mdt.mt.gov/publications/forms/const_forms.shtml

This information will be incorporated into the future Construction Administration Manual. Until a new Construction Administration Manual is issued, use this information to supplement the Construction, Office, and SiteManager Training Manuals during contract completion.

If you would like additional information please contact me at 444-0453.

 <p>Montana Department of Transportation</p> <p>CONSTRUCTION MEMO</p>	Date Issued: March 31, 2008
	Date Effective: March 27, 2008
	Related Specifications: 109.04.2
Subject: Force Account	

To: Distribution

From: Lisa Durbin, P.E., 
Construction Administration Services Engineer

This memo rescinds and replaces the construction memo issued by Mark Wissinger on October 11, 2002 and page 2-10 of the Construction Manual, entitled *Progress Payments*. Additionally, this memo reflects a supplemental specification effective with the March letting.

Force account is the basis of payment to perform extra work when procedures of negotiation are unsuccessful. The intent of the force account procedures are to reimburse the contractor for the actual costs of the work, plus some profit to avoid a negative impact to the contractor. The markups for equipment, materials and labor include profit and overhead. No additional profit will be added. Payment for force account work is to be made on the monthly estimate representing the time period in which the work was actually accomplished.

Statements of Daily Force Account Work

The quantities used in force account work must be tracked and recorded daily, both by MDT project personnel and by the contractor. On existing contracts, this information is tracked by MDT on notes sheets. On SiteManager contracts, the information is tracked in SiteManager and a report with the quantities is generated. The Project Manager or designee must meet daily with the contractor to review the quantities. The notes or reports are given to the contractor at that time. The contractor does not sign and return the report.

The force account information with the rental rates and payroll information is then provided to the contractor weekly or biweekly, to track cost information.

Materials

Materials are paid for according to the specifications, and include a 15 percent markup. Only materials incorporated into the contract are paid for.

Labor

Labor is paid for according to the specifications, and includes an 80 percent markup. Only labor used exclusively for the force account work, including a foreman, will be paid for. A foreman onsite to manage the contract will not be paid for, unless they are performing part of the force account work.

Only labor showed on a certified payroll is eligible for payment. If the contract does not require certified payrolls, a payroll must be submitted just for the force account work.

Equipment

Equipment is paid for according to Departments Equipment Rental Rate Guidelines, and includes a 10 percent markup.

Each District has one computer that can access the Equipment Rental Rates. However, only one person can access it at a time. For equipment rental rates, contact the District Engineering Officer, Traci Steen or Jeff Kirby.

copies: District Construction Engineers
 Engineering Project Managers
 Kevin Christensen, P.E.
 Construction Engineering Services Bureau
 Construction Administration Services Bureau
 Steve Garrison, Legal
 Sheila Cozzie, Civil Rights
 Helen Varcoe, Internal Audit
 FHWA



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Loran Frazier, P.E.
Chief Engineer

From: John Blacker
Maintenance Administrator

Date: June 5, 2008

Subject: MDT Guidance for Reporting Potential Erosion and Sediment Discharges

This memorandum replaces the following memoranda:

- *Policy on Reporting Erosion and Sediment Discharges or Concerns*, (September 30, 2003), and
- *Clarifying MPDES/NPDES Inspection Frequency*, (March 4, 2004).

This memorandum supplements the following memorandum:

- *Reporting environmental violations (or suspected environmental violations) to regulatory agencies*, (Revised March 12, 2008).

It is every MDT employee's responsibility to ensure compliance with environmental laws, regulations, and permits associated with our projects. This includes ensuring that violations are promptly and properly reported to the regulatory agencies.

The purpose of this memorandum is to outline MDT's procedures for reporting potential noncompliance related to sediment discharges, erosion and sediment control Best Management Practice (BMP) failures, inadequate or improperly installed BMPs, or any construction practice or operation that results in a potential violation of an erosion or sediment control regulation, authorization, permit, or permit condition.

GENERAL INFORMATION

Potential noncompliance on MDT projects must be reported, as appropriate, regardless of who holds the permit, and documented immediately with photographs, memos, letters, and/or diaries. This memorandum discusses the process to be followed whether the permit is held by MDT, the contractor, or both MDT and the contractor.

All reporting of potential noncompliance is to be conducted in accordance with applicable regulations, guidance, and permit conditions.

CSB_208 (Guidance_Reporting_Potential_Erosion_Sediment_Discharges_6-5-08)

To ensure timely action on potential noncompliance events, the contractor must provide an emergency contact number for events that take place outside of the normal working hours. The Engineering Project Manager (EPM) or Maintenance Superintendent (MS) will contact this number if a major event requiring further notification takes place.

REPORTING STEPS TO FOLLOW:

1. The EPM or MS, depending if the project is a construction or maintenance contract, will immediately notify the contractor of a potential noncompliance and document this notification. The contractor is expected to remedy the situation upon the first notification.
2. The EPM or MS will then coordinate with the District Environmental Engineering Specialist (DEES) and/or the Environmental Services Bureau (ESB) Erosion Control, Maintenance and Construction Permitting Supervisor (ECMCPS) to determine appropriate actions.
3. If the potential noncompliance requires further action (as outlined in the following steps) the EPM or MS will notify the contractor that those steps will be undertaken.
4. The EPM or MS will notify (generally by e-mail) the District Construction Engineer (DCE) or Maintenance Chief (MC) and the DEES. (The DEES will forward this notification to the MDT ESB Engineering Section Supervisor (ESS) and ECMCPS and the MDT Construction Engineering Services (CES) Bureau Construction Reviewer or MDT Maintenance Helena Headquarters) The notification should include the following information:
 - a. A description of the potential noncompliance and its cause;
 - b. The period of noncompliance, including exact dates and times; or, if not identified, the anticipated time of the potential noncompliance; and
 - c. Photos (include hyperlinks or a path to the files).
5. The DEES and/or MDT ESB will contact regulatory agencies and FHWA, as needed, to report the potential noncompliance. (DEQ requires notification within 24 hours.)
NOTE: In the case of potential noncompliance with an MPDES permit or 318 Authorization where the contractor is the sole permit holder, see the special instructions below.
6. The EPM or MS will investigate the corrective action/non-action undertaken by the contractor and coordinate with ESB and/or the DEES.
7. The EPM or MS will provide follow-up information (generally by e-mail) to the DCE or MC and the DEES. (The DEES will forward this notification to the MDT ESB ESS and ECMCPS and the MDT CES Construction Reviewer.) The notification should include the following information:
 - a. A description of the corrective action, and
 - b. Photos (include hyperlinks or a path to the files).
8. The DEES and/or MDT ESB will contact regulatory agencies and FHWA, as needed, to report the corrective action.

SPECIAL INSTRUCTIONS:

If the contractor is the sole permit holder (MPDES Storm Water Permit or 318 Authorization), **Step 5** above shall be replaced with the following:

- 5a. The EPM or MS will notify the contractor that:
 - a. The contractor, as the permit holder, is expected to report the potential noncompliance in accordance with applicable regulations, guidance, and permit conditions.
 - b. The contractor must copy the EPM or MS on the self-reporting notification and any subsequent correspondence.
 - c. If the contractor fails to report to regulatory agency (ies), MDT will report the potential noncompliance using the process outlined below.
- 5b. The EPM or MS will notify the DCE or MC and the DEES as to whether the contractor has self-reported. If the contractor fails to self-report, the DEES and/or MDT ESB will contact regulatory agencies and FHWA as needed to report the potential noncompliance.
- 6. *(Continue with Step 6 above.)*

Attached is a phone list for reporting potential environmental noncompliance.

MPDES/NPDES INSPECTIONS:

The permit holder is required to conduct inspections in accordance with the General Permit. When the Contractor is the sole permit holder, MDT will conduct reviews of the erosion and sediment control measures on opposite weeks the contractor conducts their inspection to assure timely recognition of any concerns or corrections that may be needed. The current MDT SWPPP Inspection Report can be found on the MDT website at: www.mdt.mt.gov/publications/forms/const_forms.shtml

Distribution: DAs DCEs Bureau Chiefs EPMs Legal FHWA DESSs
 Kevin Christensen, PE Jim Walther, PE Lab Supervisors
 Jon Swartz Maintenance Chiefs Maintenance Supervisors



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Reporting Potential Erosion and Sediment Discharge Noncompliance

Internal Reporting

Environmental Services Bureau	444-7228
Erosion Control/Maintenance/Construction Permitting	444-0802
Engineering Section Supervisor	444-7203
Environmental Service Bureau Chief	444-0879
Legal Services	444-7277
Staff Attorney for Environmental Issues	444-6097
Chief Counsel	444-6302
Director's office	444-6201
Chief Engineer	444-6002
Preconstruction Engineer	444-6005
Construction Engineer	444-6008
Maintenance Administrator	444-6158
Operations Manager	444-6157

External Reporting (Regulatory Agencies)

U.S. Army Corps of Engineers	441-1375
Fill in wetlands or other state waters (Clean Water Act Section 404 permit)	
U.S. Fish and Wildlife Service	449-5225
Violating Threatened and Endangered Species Act, e.g. impacting habitat of bull trout	
Montana Department of Fish, Wildlife and Parks	444-5334
Conducting work that would affect the bed or banks of a stream without or in violation of an SPA 124 Notification	
Montana Department of Environmental Quality	444-3080 or 444-0379
..... 841-3911 (after hours) or www.deq.state.mt.us/enf/	
Discharges to state water (in violation of storm water permit e.g. washing concrete into river, inadequate erosion control) and hazardous waste spills	
Environmental Protection Agency...www.epa.gov/compliance/...or.....	457-5000
Underground storage tank cleanup, hazardous waste spills, air pollution, storm water permit violations on reservations other than Blackfeet and Confederated Salish Kootenai	
Blackfeet Nation Environmental Office	338-7421
Confederated Salish and Kootenai Tribes Environmental Protection....	883-2888



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: August 15, 2005

Subject: Guidance on the use of Type 2 Object Markers and Portable Vertical Panels

This Construction Memo is intended to offer guidance for the uniform use and application of Type 2 Object Markers and Portable Vertical Panels. This memo supersedes all previous guidance offered on the use of Portable Vertical Panels.

Detailed Drawing 618-00, the Traffic Control Rate Schedule, and all applicable specifications have been revised to recognize these changes. These changes become effective with the August 2005 bid letting.

For assistance or questions related to this subject, please contact the District's Construction Engineering Services Reviewer or myself.

PJ/WCF/wcf

CC:	EPMs	CES Bureau	Lisa Durbin, PE
	Mark Wissinger, PE	FHWA Operations Engineers	Duane Williams, PE
	Loran Frazier, PE	Mike Bousliman	Jon Swartz

Guide For Use of Type 2 Object Markers and Portable Vertical Panels

8-15-05

Part 1 of this guide provides a summary of the general requirements from the Manual of Uniform Traffic Control Devices (MUTCD) 2003 Edition, on Type 2 Object Markers and Portable Vertical Panels.

Part 2 describes the Department's recommendations for the use of these devices on construction projects.

Part 1- Manual on Uniform Traffic Control Devices

Reference the MUTCD 2003 Edition, for complete information on the use of Type 2 Object Markers and Portable Vertical Panels, below is a summary of information.

Definition- Object Marker: A device used to mark obstructions within or adjacent to the roadway.

2003 MUTCD Section 3 C.01 Object Marker Design and Placement Height

Guidance:

“When used for marking objects in the roadway or objects that are 2.4 m (8 ft) or less from the shoulder or curb, the mounting height to the bottom of the object marker should be at least 1.2 m (4 ft) above the surface of the nearest traffic lane.”

“When used to mark objects more than 2.4 m (8 ft) from the shoulder or curb, the mounting height to the bottom of the object marker should be at least 1.2 m (4 ft) above the ground.”

2003 MUTCD Section 3C.03 Markings for Objects Adjacent to the Roadway

Support:

“Objects not actually in the roadway are sometimes so close to the edge of the road that they need a marker. These include underpass piers, bridge abutments, handrails, and culvert headwalls. In other cases there might not be a physical object involved, but other roadside conditions exist, such as narrow shoulders, drop-offs, gores, small islands, and abrupt changes in the roadway alignment, that might make it undesirable for a road user to leave the roadway, and therefore would create a need for a marker.”

Type 2 object markers may be used at locations such as those described above.

2003 MUTCD Section 6F.58 Channelization Devices

Support:

“The function of channelization devices is to warn road users of conditions created by work activities in or near the roadway and to guide road users. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and temporary raised islands.”

“Channelizing devices provide for smooth and gradual vehicular traffic flow from one lane to another, onto a bypass or detour, or into a narrower traveled way. They are also used to separate vehicular traffic from the work space, pavement drop-offs, pedestrian or shared-use paths, or opposing directions of vehicular traffic.”

2003 MUTCD Section 6F.61 Vertical Panels

Standard:

“Vertical panels (see Figure 6F-7, Sheet 1 of 2) shall be 200 to 300 mm (8 to 12 in) in width and at least 600 mm (24 in) in height. They shall have orange and white diagonal stripes and be retroreflectorized.”

“Vertical panels shall be mounted with the top a minimum of 900 mm (36 in) above the roadway.”

Option:

“Where space is limited, vertical panels may be used to channelize vehicular traffic, divide opposing lanes, or replace barricades.”

Part 2- MDT Guidance for use of Type 2 Object Markers and Portable Vertical Panels

General- The intent of Part 2 is:

- To clarify that Type 2 Object Markers replace post mounted vertical panels in all instances;
- To define how Type 2 Object Markers and Portable Vertical Panels should be utilized on MDT construction projects.
- The following guidance rescinds and replaces all previous guidance offered on the use of portable vertical panels.

Type 2 Object Markers- Reference Supplemental Detailed Drawing 618-00.

- Use Type 2 Object Markers to mark an object or other roadside condition adjacent to the roadway.
- Refer to Section 3C.03 Markings for Objects Adjacent to the Roadway, MUTCD 2003 Edition noted in Section 1 above.
- Refer to Standard Specification Section 618.03.8 Traffic Control at Drop-Off Areas, for placement and spacing criteria.
- Type 2 Object Markers are not intended for use as Channelizing devices.
- Type 2 Object Markers will be measured under Group 18 in the Traffic Control Rate Schedule or as specified in Section 618.03.8 Traffic Control at Drop-Off Areas.

Portable Vertical Panels- Reference Detailed Drawing 618-00.

- Refer to Section 6F.58 Channelization Devices MUTCD 2003 Edition, noted in Section 1 above.
- Use engineering judgment when selecting which Channelizing device best fits a given situation, i.e. flexible guide posts, drums, portable vertical panels, etc.
- Use Portable Vertical Panels for channelization to guide road users.
- Portable Vertical Panels are not intended for use in applications to mark an object or other roadside condition adjacent to the roadway.
- Portable Vertical Panels are measured under Group 19 in the Traffic Control Rate Schedule.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Matthew R. Strizich, P.E.
Materials Engineer

Date: June 7, 2007

Subject: International Roughness Index (IRI) Testing

This Construction Memo redefines the process for determining pre-paving IRI values and ensuring the proper category is included in the contract. This memo replaces the previous process defined in Paul Jagoda's Construction Memo dated March 12, 2004.

To provide uniformity, use the following guidelines for the use of the pre-paving IRI. Please reference the Special Provision for Ride Specification for Flexible Pavement in your project's contract documents.

- The initial IRI data used to determine the project classification for the letting needs to be gathered prior to letting the contract. The prebid measurement should be done by the District Lab, as close to the project letting date as possible. Pavement Management's network results may be used if the District is unable to do the testing.
- District personnel will identify the Category of each project on the District Project Estimate Questionnaire sent out by the Contract Plans Bureau.
- IRI data used to determine the project classification and to be used to determine the pay adjustment factors should be measured within eight (8) months of the contract letting date. It is preferable to do this testing as close to the letting date as possible. This testing should be done by the District Lab, although the Pavement Analysis Section of the Materials Bureau can also do it.
- Under normal circumstances, a new prepaving IRI measurement should not be made once the project has been let. A check of the original measurement may be made in the following circumstances:
 1. If the original measurement was made more than twelve (12) months prior to the scheduled start of paving and a remeasurement is requested by the contractor.
 2. If the contractor requests a remeasurement and the Engineering Project Manager believes there is a possibility the classification of the project may have changed from the classification in the contract. IRI measurements do not degrade significantly in a year, so EPM's should remember this should only be done in unique circumstances.
- A pre-paving IRI should never be run when the condition of the roadway is affected by frost in any way.
- If a different Project Classification results from the pre-paving IRI measured after the project letting, a change order must be written to reflect the new project classification.

For additional information, please contact your District's Construction Engineering Services Reviewer or Matt Strizich.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: January 28, 2008

Subject: Motor Carrier Services Construction Guide Update

This Construction Memo is an update to the previous memo and develops guidance to assist Motor Carrier Services (MCS) during construction activities and provide for the uniform application and enforcement of the project's specifications and laws in regards to load restrictions, diesel fuel used on projects, permits, license and taxes. These items are to be discussed at the Preconstruction conference. One of the reasons for these requirements is to prevent damage to the new project.

To provide uniformity and reduce the potential for errors, please find the attached Preconstruction Instructions that are to be discussed at Preconstruction meetings. Load limit restrictions must be enforced on all Structures, completed and accepted gravel surfaces, Treated Base Courses, CTB, Primed or Tacked Surfacing, Plant Mix Base and Plant Mix Surfacing. These guidelines are to be used in conjunction with the following specifications:

- Subsection 101.03 Definition of Structures
- Subsection 107.02 Permits, Licenses, and Taxes
- Subsection 107.08 Load Restrictions
 - Material quantities in excess of the maximum legal weights are to be deducted from the quantity considered for payment.
 - Bridge formula calculations are required along with a drawing showing distances between axles, truck tare weight and overall length for each haul unit. A copy of the drawing is to be retained in each truck.
- Subsection 107.27 Diesel Fuel Used on Project

To assure all needed project information is communicated between the Districts and MCS, please provide the following:

- Define the Project Limits in the Preconstruction Conference.
- Provide a contact list of District and Project Personnel to MCS at the Preconstruction Conference.
- Provide MCS with aggregate source locations and haul roads to be used during construction.

For assistance or questions related to MCS Inspections, please contact the Area MCS Office or the District's Construction Engineering Services Reviewer.

PJ/pj

CC: Loran Frazier, PE	District Office Engineers	CES Bureau	Lisa Durbin, PE
Kevin Christensen, PE	FHWA Operations Engineers	Dennis Sheehy	Patrick Metzger-MCS
Mark Moberley-MCS	Jodee Alm	Dan Smith, PE	
Judy Bauer -FTMA	EPMS		

MCS Preconstruction Outline

Utilize this outline in conjunction with the following pages to fully cover:

- MCS operations within and beyond construction operations;
- Explain DOT and MCS expectations; and
- Supply the contractor and subcontractor with their legal obligations in regards to those areas enforced by Motor Carrier Services Officers (size, weight, licensing, and fuel taxation).

Page 3 – This is a list of definitions utilized throughout this document. These definitions will be of value, in helping the contractor to understand their role in legal operations, when and where the rules apply, and define the boundaries of operation and enforcement.

Pages 4 and 5 – Details the size and Weight limitations and MCS's role in enforcement. Also included are any exemptions the contractor may utilize during the construction project, within the construction zone.

Pages 5 and 6 – Details the licensing and registration requirements and the requirements/restrictions to Gainful Occupation of vehicles use on the construction project.

Pages 6 and 7 – Details the regulations, restrictions and exemptions for the use of fuels on the construction project.

Page 8 – Lists the information and phone numbers for the construction personnel to use, in order to contact MCS Weigh Stations, Patrol Officers, Captains, and the Helena MCS Office.

Pre-Construction Instructions

This document provides for the cooperative uniform application and enforcement of the project specifications and laws between Construction, MCS and the contractor in regards to load restrictions, diesel fuel used on projects, permits, license and taxes. These items are to be discussed at the Pre-construction conference. As clarification use the following definitions.

Bituminous surfacing courses: A mixture of graded aggregate and asphalt, which is used as a wearing course. This treatment is usually placed in two or more specified lift thicknesses.

Bituminous surfacing lifts: A mixture of graded aggregate and asphalt, which is used as a wearing course. This treatment is placed in a specified thickness.

Blue tops/Finish Grade: Grade stakes for subgrade and aggregate surfacing used in highway construction. With the incorporation of the Finished Grade Control in the 2006 edition of the Standard Specifications, physical blue top stakes are not required and the point when the grade is complete will need to be communicated from Construction to MCS.

Cement Treated Base (CTB): A compacted mixture of graded aggregate, cement, and water, which is used as a base course for the construction of highways, airport runways and taxiways

Completed and accepted gravel surfaces: Aggregate surface, used as a surface or base course, that is graded to the typical cross section and profile grade and meets both moisture and density requirements. When the surface is complete and accepted Construction is to inform MCS.

Construction zone: An area on a public highway or on the adjacent right-of-way where construction, repair, maintenance, or survey work is being performed by the department of transportation, a local authority, a utility company, or a private contractor under contract with the department of transportation or a local authority. A construction zone may include a work zone. (See 61-8-314 MCA)

Open grade friction course: An asphalt pavement surface course that has a porous texture, which allows the rapid drainage of water through the course and out the shoulder. (*Currently not used by MDT*)

Plant mix base: A compacted mixture of graded aggregate and asphalt, which is the lower or underlying pavement course atop the subbase or subgrade and under the top or wearing course.

Plant mix surfacing: Is a mixture of graded aggregate and asphalt, which is used as a wearing course. This definition is used interchangeably with **Bituminous surfacing**.

Prime/aggregate treatment: A fluid asphalt of low viscosity (highly liquid) that penetrates into a non-bituminous surface (gravel) upon application. It is used to prepare an untreated base for an asphalt surface. Aggregate treatment is a combination of dust palliative and tack coat that is used as a bonding layer between the gravel surface and new plant mix surface.

Project limits: An area where work is to be performed as specified in the contract documents. A specified area where the construction, repair, maintenance, or survey work is actually taking place.

Structure: Bridges, culverts, catch basins, drop inlet, retaining walls, cribbing, manholes, endwalls, buildings, sewers, service pipes, underdrains, foundation drains, and other features that may be encountered in the work. Defined in Standard Specification 101.03.

Tack coat: A combination of asphalt cement, water and a small quantity of emulsifying agent. It is used to ensure a good bond between the surface being paved and the overlaying new course.

Treated base course: The layer immediately beneath the surface course. It provides additional load distribution and contributes to drainage and frost resistance. Base courses are usually constructed out of aggregate, hot mix asphalt or cement treated base.

Work zone: The area where the construction, repair, maintenance, or survey work is actually taking place. The boundaries of the work zone must be clearly identified by the posting of signs. (See 61-8-314 MCA)

** Note: Where referenced the above will appear in *italics*.

SIZE

107.02 (Standard Specifications) Permits, Licenses, and Taxes.

Obtain all legally required permits and licenses, pay all charges, fees, taxes, and fuel taxes giving all notices necessary and incidental to the lawful prosecution of the work.

** Note: Oversize permits are not required within the confines of the *construction zone* but are required outside the confines of the *construction zone*.

Sign Trailers Pulled Behind Light Vehicles

Within the confines of a *construction zone*, a vehicle may pull up to eight (8) signs on a two-lane road and twelve (12) signs on a four-lane road. In order for this policy to apply, the *construction zone* must have in place initial *construction zone* signs at the beginning and end of the *project limits*.

WEIGHT

107.02 (Standard Specifications) Permits, Licenses, and Taxes.

Obtain all legally required permits and licenses, pay all charges, fees, taxes, and fuel taxes giving all notices necessary and incidental to the lawful prosecution of the work.

** Note: Overweight permits are not required within the confines of the *construction zone* but are required outside the confines of the *construction zone*.

107.08 (Standard Specifications) Load restrictions.

Do not exceed legal load restrictions when hauling material and equipment on public roadways and bridges within and beyond the *project limits* and on all new and existing portland cement concrete roadways, {*completed and accepted gravel surfaces*}, *treated base courses*, *bituminous surfacing lifts and courses*, including *plant mix base*, *plant mix surfacing*, and *seal and cover*.

Do not place loads on a concrete pavement, *treated base*, or *structure* before the curing period has been achieved.

Repair damaged roadways and *structures* resulting from construction operations at Contractor expense.

Measure and analyze truck legal load limits by the bridge formula before hauling any material over existing or newly paved roadways and bridges. Furnish a drawing showing distances between axles, truck tare weight, and the overall length of each truck {prior to hauling or placing operations}.

Show a minimum of two applications using the bridge formula on the drawing. Include on the first application the overall length between axles. For the second application, do not consider the steering axle, and add the value obtained from the bridge formula to the anticipated load on the steering axle. Use the lesser of the two values obtained as the legal load. Retain a copy of the appropriate drawing in each truck. Do not exceed established legal load weights for single axle and tandem axles.

{If raising a retractable or tag axle results in the truck being over the maximum legal weight, only raise the axles when backing to unload at a chip spreader, windrow, or plant mix paver. Back the minimum distance possible while over legal weight restrictions. Do not exceed the legal weight on the steering axle by more than 25 percent or tandem axles by more than 50 percent while backing with the retractable or tag axles lifted.}

The weight on a truck in excess of the maximum legal weight as determined above will be deducted from the quantity considered for payment.

Comply with this provision and all applicable laws, rules, and regulations related to operation of motor vehicles on public roads.

Trucks operated on public roads may be checked by the Department's Motor Carrier Services and fines levied for exceeding legal loads.

Do not use existing bridges, new bridges, or bridges to be removed but still in use by the public as work platforms, work bridges, or to support or move equipment without the Engineer's written approval.

Approval will be granted only where load analysis and review of traffic control, safety, and convenience show it to be in the public interest.

No additional compensation will be considered or allowed for any violation of these provisions.

Note: Text that is enclosed in { } are additions from supplemental specifications.

61-10-107 (MCA) Maximum gross weight.

(1) An axle may not carry a load in excess of 20,000 pounds, and no two consecutive axles more than 40 inches or less than 96 inches apart may carry a load in excess of 34,000 pounds. An axle load is the total load transmitted to the road by all wheels whose centers are included between two parallel transverse vertical planes 40 inches apart, extending across the full width of the vehicle. For purposes of this section, axles 40 inches or less apart are considered to be a single axle. The maximum gross weight allowed on a vehicle, group of axles, or combination of vehicles must be determined by the formula:

$$W = 500((LN/(N - 1)) + 12N + 36)$$

in which W equals gross weight, L equals wheel base in feet, and N equals number of axles, except that two consecutive sets of tandem axles may carry a gross load of 34,000 pounds each if the overall distance between the first and last axles of the consecutive sets of tandem axles is 36 feet or more. The maximum gross weight allowed on a vehicle may not exceed the weight limits adopted by the department. The department shall adopt rules for weight limits based upon the most recent version of 23 CFR, part 658, appendix c, for vehicles operating in Montana.

(2) (a) Notwithstanding a vehicle's conformance with the requirements of subsection (1), except for the steering axle, all axles weighing over 11,000 pounds must have at least four tires or have wide-base tires. The maximum load on an axle, other than a steering axle, equipped with wide-base tires is limited to 500 pounds for each inch of tire width.

(b) The provisions of subsection (2)(a) do not apply to passenger buses.

(c) For the purposes of this section, wide-base tires are tires that are 14 or more inches in nominal width. The maximum tire weight limit is computed for wide-base tires based on the number of inches shown on the tire marking, or if the tire marking is shown by metric size, the tire weight limit is computed by conversion of the metric size.

(3) This section does not apply to highways that are a part of the national system of interstate and defense highways (as referred to in 23 U.S.C. 127) when application of this section would prevent this state from receiving federal funds for highway purposes.

LICENSING / REGISTRATION

107.02 (Standard Specifications) Permits, Licenses, and Taxes.

Obtain all legally required permits and licenses, pay all charges, fees, taxes, and fuel taxes giving all notices necessary and incidental to the lawful prosecution of the work.

** Note: Maximum GVW fees must be paid on all vehicles.

61-3-701 (MCA) Out-of-state vehicles used in gainful occupation to be registered -- reciprocity.

(1) Before a motor vehicle that is registered in another jurisdiction may be operated on the highways of this state for hire, compensation, or profit or before the owner or user of the vehicle uses the vehicle if the owner or user is engaged in gainful occupation or business enterprise in the state, including highway work, the owner of the vehicle shall register the vehicle at the office of a county treasurer or an authorized agent of the department. Upon satisfactory evidence of ownership submitted to the county treasurer or the department's authorized agent and the payment of fees in lieu of taxes or registration fees, if appropriate, as required by 15-8-201, 15-8-202, 15-24-301, 61-3-529, 61-3-537, or 61-3-560 and 61-3-561, the treasurer or authorized agent shall enter the vehicle for registration purposes only on the electronic registry maintained by the department under 61-3-101.

(2) Upon payment of the fees or taxes, the treasurer or the department's authorized agent shall issue to the vehicle owner a registration receipt and the proper license plates or other identification markers. The license plates or identification markers must at all times be displayed upon the vehicle when operated or driven upon roads and highways of this state during the registration period indicated on the receipt.

(3) The registration receipt does not constitute evidence of ownership but must be used only for

registration purposes. A Montana certificate of title may not be issued for a vehicle registered under this section.

(4) This section is not applicable to a vehicle covered by a valid and existing reciprocal agreement or declaration entered into under Montana law.

61-3-702 (MCA) Foreign vehicles to display number plates.

All foreign registered and licensed motor vehicles shall also carry in plain sight thereon the license plates or device from such other state or foreign country.

61-3-703 (MCA) Purpose.

Sections 61-3-701 and 61-3-702 shall be solely for the purpose of taxation, registration, and identification of vehicles operated in this state that have paid a license in another state or foreign country, and otherwise than as herein specifically set forth shall not be construed as a repeal of any laws or parts of laws having to do with the registration or licensing of automobiles within the state.

FUEL

All holders of the Special Fuel Users Permit must use only clear diesel on all projects, both public and private.

Any Public Road Projects

All contractors/sub-contractors participating on any public road projects will not store or use dyed diesel in equipment, vehicles and stationary engines within the right-of-way of the public road project. Contractors or sub-contractors who use or store dyed diesel on any MDT project are in violation of MDT's contract and may be suspended for up to 6 months from participating in future MDT contracts.

When equipment and/or Special Mobile(SM)-plated vehicles are moved onto any public road project and contain dyed diesel you must:

- Call MDT at (406) 444-0806 (24 hours a day).
- Identify the equipment or vehicle.
- Provide the location of job site.

Once the equipment or SM-plated vehicles are on the project, they must be refueled with tax paid (clear) diesel. When moving equipment and/or SM-plated vehicles off any project with tax paid (clear) diesel, a refund will not be allowed for tax paid (clear) diesel fuel remaining in the supply tanks.

All vehicles must conform to laws and rules governing travel on public roads.

Permit Requirements

The Montana Department of Transportation (MDT) requires all contractors/sub-contractors that use special fuel on public road projects to:

- a) Get permitted as a special fuel user (SU),
- b) Submit a minimum \$5,000 bond,
- c) Complete and return annual renewal form,
- d) The Special Fuel User must use clear fuel in all vehicles and equipment on all projects, both public and private.

Failure to complete or maintain any of the above requirements in good standing may disqualify you from participating in public projects.

Application for Permit

The application for a SU permit must be correctly completed and returned to MDT before any MDT contract is awarded to the contractor/sub-contractor. The application is a one-page form (front and back) and must be completed in its entirety. The form with original signatures must be returned to MDT. Fax copies will not be accepted. Contact # (406) 444-6130; or Web site: MDT.Gov-Doing Business tab

Bonds

The bond is to assure that all the tax, penalty and interest have been paid to the department. The following are types of bonds accepted by MDT:

- ✓ Surety bond – Acquired through an insurance company by paying premiums. Require original signatures from the insurance company.
- ✓ Certificate of Deposit (CD) – Contractor/Sub-Contractor collects the interest. The name on the CD must read as follows:” _____ (Company or Contractor’s name) OR MDT”.
- ✓ Cash Bond – no interest is earned.

Production of Material

Project Pit/Quarry: Equipment and vehicles used in the development and production of materials in a pit/quarry for a specific contract must use tax paid (clear) diesel. This pit/quarry is considered part of the project site and must conform to contract requirements of the project.

Permanent Pit/Quarry: This is a pit/quarry that is a permanent physical place where materials are produced and supplied to various projects. A permanent pit/quarry that supplies a public road project may use only tax paid (clear) diesel fuel in equipment and vehicles.

Any tax paid (clear) diesel used in a non-taxable manner qualifies for a refund (see definitions non-taxable). The refund may be claimed on the SU tax return if the pit/quarry owner has a SU permit. Those that do not have a SU permit can get a refund by contacting MDT for a refund application.

2005 legislation requires material used for construction, reconstruction, or improvement in connection with work performed on any public road project must be produced using tax paid (clear) diesel.

Formula to compute fuel used to produce materials for taxable projects is as follows: ARM 18.10.324

Asphalt is composed of 94% aggregate. (1cu. Yd. = 1.88 tons)

Concrete is composed of 75% aggregate. (1cu. Yd. = 2 tons)

.28 gallons per ton is based on industry average. (.13 gallons per ton may be used if electrical power is purchased from a commercial source.)

Examples:

Concrete:

100 cu. yd. of concrete = 200 tons

200 tons X .75 = 150 tons of aggregate.

150 tons X .28 = 42 gallons (diesel generator)

150 tons X .13 = 19.5 gallons (electrical power)

Asphalt:

100 cu. yd. of asphalt = 188 tons

188 tons X .94 = 176.72 tons of aggregate.

176.72 tons X .28 = 49.5 gallons.

MCS Contact List

Helena Office

Mark Moberley

(406) 444-6139 (office)

(406) 444-6136 (fax)

CSB107_08 (MCS_1-28-08)

Dan Moore	(406) 444-0454 (office)	(406) 444-6136 (fax)
Region-1 (Missoula)		
Captain Patrick Metzger	(406) 678-4260 (office)	(406) 544-3736 (cell)
Lieutenant Dave Green	(406) 431-2400 (cell)	
Region-1 Patrol Officers		
Joe Lavadure (Kalispell)	(406) 249-3929 (cell)	
Tracy Phillips (Haugan)	(406) 670-0351 (cell)	
Brad Marten (Missoula)	(406) 531-2933 (cell)	
Steve Schwartz (Missoula)	(406) 531-2934 (cell)	
Region-1 Weigh Stations		
Clearwater	(406) 244-5460	(406) 244-5777 (fax)
Haugan	(406) 678-4257	(406) 678-4317 (fax)
Kalispell	(406) 257-2684	(406) 756-0117 (fax)
Lima	(406) 276-3429	(406) 276-3353 (fax)
Region-2 (Butte)		
Captain Mike Poole	(406) 444-9260 (office)	(406) 490-1658 (cell)
Vacant	(406) 431-0806 (cell)	
Region-2 Patrol Officers		
Bob Colman (Bozeman)	(406) 579-3441 (cell)	
Eric Belford (Butte)	(406) 490-8699 (cell)	
Jim Kinsey (Great Falls)	(406) 390-3020 (cell)	
Myrlin Schatz (Helena)	(406) 431-6069 (cell)	
Merlin Frydenlund (Shelby)	(406) 450-2501 (cell)	
Region-2 Weigh Stations		
Armington Junction	(406) 738-4261	(406) 738-4262 (fax)
Bozeman	(406) 587-0727	(406) 586-9602 (fax)
Butte EB	(406) 782-8985	(406) 723-2135 (fax)
Butte WB	(406) 533-3699	(406) 533.3698 (fax)
Coutts (Alberta)	(403) 344-5063	(403) 344-3044 (fax)
Havre	(406) 265-9033	(406) 265-8676 (fax)
Region-2 Training Officer		
Jeff McLaughlin	(406) 431-0806	
Region-3 (Billings)		
Captain Doug Park	(406) 657-0201 (office)	(406) 698-8286 (cell)
Lieutenant Russ Christoferson	(406) 431-1269 (cell)	
Region-3 Patrol Officers		
Gene Peigneux (Billings)	(406) 670-0347 (cell)	
Brian Dandrea (Billings)	(406) 471-6283 (cell)	
Dan Bidwell (Broadus)	(406) 670-0350 (cell)	
Jerry Switzer (Circle)	(406) 250-2066 (cell)	
Kevin Adkins (Hardin)	(406) 670-0348 (cell)	
Linda Hoagland (Wibaux)	(406) 670-0349 (cell)	
Region-3 Weigh Stations		
Billings (eastbound)	(406) 657-0204	(406) 657-0934 (fax)
Billings (westbound)	(406) 657-0203	(406) 657-0933 (fax)
Broadus	(406) 436-2531	(406) 436-2813 (fax)
Crow Agency	(406) 638-2210	(406) 638-4488 (fax)
Culbertson	(406) 787-5323	(406) 787-6113 (fax)
Wibaux	(406) 345-8254	(406) 345-8293 (fax)



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: District Construction Engineers

From: Mark Wissinger, P.E.
Construction Engineer

Date: April 10, 2006

Subject: Moisture Requirements for Compaction

This memo clarifies the documentation process to follow when the contractor makes a written request to the Engineering Project Manager (EPM) to compact soils at a lower moisture content, in accordance with Standard Specification 203.03.3. Following is the recommended process:

- The contractor makes a written request to the EPM, to include:
 - The soils class,
 - The locations of the soil using the project stationing.
- The EPM reviews and researches the request by discussing the proposal with the District Materials Lab Supervisor (DMS) and District Geotechnical Engineer.
- They will investigate the soil/moisture relationship and determine if compacting the soils at lower moisture content is detrimental to the long term serviceability of the roadway.
- When the EPM, DMS, and Geotechnical Engineer make a determination if the request is to be approved/denied, the EPM sends a written response to the contractor to include any stipulations. In instances where concurrence cannot be reached, the Materials Engineer will make the final decision.
- Copies of response letters are to be placed in the project file, Lab file and attached to the first compaction summaries it applies to. All other summaries should have a note explaining that the compaction was accepted at the lower moisture content in accordance with the approval letter.

This process provides for some flexibility in moisture content requirements, by the use of engineering judgment, while assuring that soil density is not compromised. Past project history has shown that certain soil types may be more readily compacted when the moisture content is more than 2% under optimum. A-1-a, A-1-b, and A-4 are the soil types where this is most likely to occur. A-6 and A-7 soils should not be accepted if the moisture content does not meet the +/- 2% requirement.



*Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001*

Memorandum

To: District Construction Engineers

From: Mark A. Wissinger, PE
Construction Engineer

Date: December 31, 2001

Subject: Construction Non-Uniformity Complaint Form

Please find the attached Construction Non-Uniformity Complaint Form. Copies of this form can be found on the Construction Bureau's Web Page and located under: Forms/Construction/Non-Uniformity Complaint Form.

This form's intent is to address non-uniformity issues and improve statewide uniformity and contract administration. This form is to be given to any person complaining of a non-uniformity issue with MDT construction contracts. It will be that person's responsibility to completely fill out the form and sign it. If it is not signed it will not be processed. The completed form is to be submitted to the Construction Engineer in the Construction Bureau by the person filing the complaint. The address is on the form.

If you have any questions or require additional information, please contact me.



Montana Department of Transportation
PO Box 201001
Helena MT 59620-1001

Construction Non-Uniformity Complaint Form

This form must be filled out in its entirety and signed to be treated as a complaint.

1. Explain the situation of non-uniformity in detail.
2. Was this a non-uniformity in contract administration, interpretation, testing procedure, etc?
3. Describe the specification or situation and how it was applied non-uniformly.
Describe the project, location, and times this occurred.
4. Other comments.

Signature_____Date_____

Title and Organization_____

- Once completed and signed, **this form is to be submitted to the Construction Engineer**, at the following address:
Montana Dept. of Transportation-Construction Bureau
2701 Prospect Ave., PO Box 201001
Helena, MT 59620-1001
- The Construction Bureau will research the complaint and compile a summary of findings.
- The findings will be distributed to all DCEs to ensure continual process improvements and uniformity.

Non-uniformity (12-12-01)



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Matthew R. Strizich, P.E.
Materials Engineer

Date: July 26, 2007

Subject: Nuclear Gauge Storage and Seating Sand

This Construction Memo clarifies the requirements for nuclear gauge storage and the required use of seating sand when performing density testing with a nuclear gauge.

Guidelines for Moisture/Density Meters in Vehicles

The Materials Bureau has been asked the question, “is it O.K. to store nuclear gauges in your vehicle at night?” The issue was discussed with field personnel and members of the Radiation Safety Committee and it was decided nuclear gauges should only be stored in a vehicle overnight in emergency or extenuating circumstances.

The majority of gauges stolen each year nationwide are out of vehicles. In many of these instances the gauges are not the target of the theft, but it doesn’t make it any less of a problem. Listed below are guidelines for gauge storage that should be followed. Storing gauges in a vehicle on a regular basis is not acceptable.

When away from the main Lab storage site, nuclear gauges should be chained to a sturdy non-removable object in a lockable storage building or office when being stored overnight somewhere. This building should be locked whenever MDT personnel are not around to provide protection of the gauge. If keeping your gauge in your vehicle at night is the only option available then the guidelines below should be used.

1. Your vehicle should be parked in a fenced secure area such as the District, Area or Maintenance complex.
2. Secure the gauge to the vehicle by two or more of the following means:
 - A. Locked to the vehicle preferably with the sturdy lock and cable provided by MDT.
 - B. Bolted to the vehicle, preferably with the new tie-down plate available through any District Area Lab..
 - C. Inside the vehicle with the doors locked as in a Suburban or van.
3. For all vehicles, especially open bed trucks, the ignition keys should be removed and the doors locked. This provides two means of security that prevent the vehicle with the gauge from being stolen.

Seating Sand

MT 212, Subsections 3.4.8 and 3.4.9 require the use of seating sand when measuring the moisture or density of in-place materials with a nuclear densometer. This is not an optional part of the test procedure! Foregoing the use of seating sand will result in inaccurate test results in most instances and need to be avoided.

Material that is too rocky to test and has significant voids (such as shot rock) is an example of a situation where the use of seating sand would not be required when checking for uniformity. Obtain approval of the Engineering Project Manager any time seating sand is not going to be used.

If you have any questions about either of these issues, email or call Rex Hoy at rhoy@mt.gov or (406)444-6270.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark A. Wissinger, PE
Construction Engineer


Date: July 11, 2003

Subject: Perforated Stop/Slow Flagger Paddles

A few months ago the traffic control contractors approached the department requesting to use perforated stop/slow flagger paddles. The argument for their use was they functioned better in high wind conditions and served the public better than using a non-perforated paddle or a flag. FHWA expressed concern that there was no standard for the sign face to ensure the shape and message was not lost due to the perforations. We asked the contractors to submit a template for review before their use became common. These perforated signs are being used more frequently and in several instances when wind was not a factor.

As the perforated signs top/slow paddles have not been formally accepted please advise your Project Managers to have them removed from use on projects until further notice. They should be replaced within 2 days of notification.

If you have any questions or require additional information, please contact me.

	Montana Department of Transportation	Date Issued: 6/6/08
CONSTRUCTION MEMO		Date Effective: 6/6/08
		Related Specifications:
Subject: Plant Mix Special Provisions		

To: Distribution

From: Matthew R. Strizich, P.E. 
Materials Engineer

The standard Special Provisions covering plant mix used on MDT projects have recently been revised. These changes are outlined below, along with guidance on necessary plan revisions. The new Special Provisions are effective for all projects starting with the August 2008 letting.

- The Grade S Volumetrics special provision has been revised. Grade S plant mix and this special provision should be used on all projects with a plant mix plan quantity of more than 8,000 tons. Under no circumstances should it be used on projects with a plan quantity of less than 8,000 tons.
- A new Commercial Mix special provision has been developed. The new special provision replaces the Grade D Commercial Tested, Grade D Commercial Non-tested, and Grade S Non-Volumetrics specials currently being used. This special should be used on all projects with a plan quantity of less than 8,000 tons. It can also be used on projects with over 8,000 tons when warranted by the specifics of the project, although Grade S Volumetrics is preferred.

No plan changes will be required with the new Grade S Volumetrics special provision. Projects with more than 8,000 tons of plant mix that currently specify Grade S Non-volumetrics, will need to be changed to Grade S Volumetrics.

Commercial Mix will require the following:

- Select the appropriate bid item based on the PG binder recommendation from Surfacing Design. The following options are available.
 - English
 - 401020021 Ton Commercial PI Mix – PG 70-28
 - 401020022 Ton Commercial PI Mix – PG 64-28
 - 401020023 Ton Commercial PI Mix – PG 58-28


Metric

- 401020505 Ton Commercial PI Mix – PG 70-28
- 401020506 Ton Commercial PI Mix – PG 64-28
- 401020507 Ton Commercial PI Mix – PG 58-28

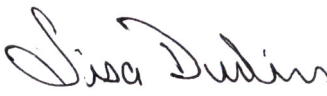
- The Plant Mix heading shown in the surfacing frame should match the bid item selected for the job. Include the PG binder grade.
- Include the following in the basis of plan quantity when Commercial Mix is specified.
 - Asphalt Cement – Grade S ¾” Agg 5.4%
 - Asphalt Cement – Grade S ½” Agg 5.8%
 - Asphalt Cement – Grade D 6.0%
 - Hydrated Lime 1.4%
 - Tack (asphalt surfaces) 0.025 gal per sq. yard (undiluted)
 - Tack (all other surfaces) 0.050 gal per sq. yard (undiluted)
- Do not show estimated quantities in the surfacing frames for the following items:
 - Hydrated Lime
 - Asphalt Cement
 - Tack

NOTE: Quantities for Hydrated Lime and Asphalt Cement should still be shown when associated with Grade S Volumetric Plant Mix Surfacing.
- Eliminate the columns for asphalt cement and tack currently shown in the Quantities frames shown under each typical section. NOTE: Quantities for Asphalt Cement should still be shown when associated with Grade S Volumetric Plant Mix Surfacing.
- Do not show estimated approach quantities in the Notes section for the following items:
 - Asphalt Cement
 - Tack

NOTE: Quantities for Asphalt Cement should still be shown when associated with Grade S Volumetric Plant Mix Surfacing.
- A separate special provision eliminating acceptance testing on the commercial mix will be available. Districts will choose whether to exclude testing on the Commercial Mix on the questionnaire sent out by Contract Plans prior to advertising.

	Montana Department of Transportation	Date Issued: May 6, 2008
CONSTRUCTION MEMO		Date Effective: March 27, 2008
		Related Specifications: 108.02, 105.15.2, 108.08
Subject: Project Dates		

To: Distribution

From: Lisa Durbin, P.E., 
Construction Administration Services Engineer

This memo is to clarify some of the critical dates on a contract and the procedures that need to be followed at that time.

Notice to Proceed Date

This date is established either in the contract or by the Construction Administration Services Bureau at the time of award. It is the date that contract time starts being charged on the contract.

No work may be performed within the right-of-way limits before this date, including mobilization, traffic control installation, temporary erosion control, etc. If the contractor wants to begin work before the Notice to Proceed date and all requirements of Subsections 103.07, 108.01.2 and 108.03 are met, a change order may be executed to move up the date. Note; changing the Notice to Proceed date does not affect the amount of available contract time.

On flex time contracts, the effective date is the Notice to Proceed date. By the contract, the contractor may select a date earlier than this. Contract time assessment will begin on that date unless the contractor chooses to start work on an earlier date. In this instance, since it is allowed by contract, a change order is not required. However, all requirements of Subsections 103.07, 108.01.2 and 108.03 must still be met. If an earlier date is selected in writing and approved, the EPM must send an email to the Construction Administration Services Bureau with the new date so that all contract records for the Notice to Proceed date can be changed accordingly.

Work Begin Date

This date is when the contractor actually starts work within the right-of-way. It cannot be earlier than the Notice to Proceed date. On contracts awarded before the SiteManager implementation, the EPM must send an email to the distribution list "MDT SiteMgr Milestones" for their district that work has begun. In SiteManager, this date will be

populated with a trigger when the first work item is recorded on a DWR. The system will automatically send an email to this distribution list.

On flex time contracts, this notification is separate from a notification changing the Notice to Proceed date.

Paving Start / Paving Complete Dates

These dates are required for CES Bureau and Materials Bureau personnel. When paving starts and ends, the EPM must send an email to the distribution list “MDT SiteMgr Paving” for their district with the date. In SiteManager, the EPM enters the appropriate Key Date. The system will automatically send an email to those personnel.

Final Inspections

This is the date when the final inspection for the work and the General Permit for Storm Water Discharges Associated with Construction Activities (General Storm Water Permit) inspection are complete. These can be completed concurrently. The General Storm Water Permit close-out checklist is completed during the inspection. When this is completed, the EPM must send an email to the distribution list “MDT SiteMgr Milestones” for their district with the date. In SiteManager, the EPM enters the Key Date. The system will automatically send emails to those personnel.

The contract may be re-inspected, if needed, to ensure all punch list items are complete. If this is done, send a new email or revise the Key Date in SiteManager, as applicable.

Substantial Work Complete Date

This occurs after the EPM and contractor agree all punch list work is complete. This date begins the timeline for the contract final and the final documentation. This is the date when the physical work is complete on the contract, and the Contractor’s Final Inspection form (CSB105_15_2) has been completed by the contractor and approved by the EPM.

Contract time charges are discontinued after this date. The EPM may suspend contract time when the only remaining items of work are punch list items, depending on the quantity and magnitude of the items. If the contractor does not submit the Final Inspection form in a timely manner, time assessment should continue.

Other Dates

There are other Key Dates and Checklist Event Dates in SiteManager. Additional information on all of the dates is in the SiteManager business processes and training materials.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Joel Marshik, P.E., Chief Engineer
Highways and Engineering Division

Date: February 21, 2003

Subject: PTW Subgrades

The purpose of this memo is to rescind and replace the memo of this same subject issued by Gary A. Gilmore, former Chief Engineer of the Highways and Engineering Division, on September 12, 2000. This memo is being replaced due to the occasional misinterpretation of its intent. The original intent of the memo was to be a guide rather than a strict policy statement.

Specifically, the August 28, 2000 memo has on occasion been interpreted to mean that subexcavation to a depth of 600 mm (2 feet) below the new subgrade elevation is required in any instance where the proposed subgrade requires the removal of the PTW surfacing. That is not the case; strict adherence to this interpretation could supersede soils analyses or Geotechnical studies and result in unnecessary project costs.

In all instances where the new-finished subgrade requires removal of the PTW surfacing, sufficient soils information is required to properly characterize the in-place soils. A **minimum** depth of 600 mm (2 feet) below the **new** proposed subgrade is required not only to determine the type of soil, but also to identify the soil condition and the potential for constructability problems due to unstable soils. Using this information, it should be possible to design a surfacing treatment that meets the required design life, is constructible, and is the most economical.

There are several options to consider when determining the best treatment option when the existing soils at the new subgrade elevation are a concern, including:

Grade Raise

The age-old practice of instituting a grade raise to avoid unstable subgrade soils is an option to consider. We recognize that this option is becoming less desirable in design due to Right-of-Way and, more importantly in some instances, "footprint" issues and the associated environmental impacts. When these issues do not preclude a grade raise, and sufficient quantities of special borrow meeting the required "R" value are economically available, this remains a viable option.

Instituting a grade raise during construction is becoming increasingly impractical due to the same issues faced by design. The increasing unavailability of material **and** the time element involved in resolving these issues also makes it an undesirable option under construction. These are some of the reasons why it is necessary that the soils requiring this type of treatment be identified and accounted for during the preconstruction phase of a project.

Subexcavation

There are many circumstances that may dictate the need for subexcavation. Some examples are:

- The in-place soils “R” values are not sufficient for the designed surfacing section, and redesign of the surfacing section is impractical due to economic, environmental, Right-of-Way, or other concerns.
- The in-place soils “R” values are not sufficient for the designed surfacing section, and a grade raise is not feasible.
- The in-place soils “R” values are not sufficient to carry construction loading, and subexcavation and replacement is the most economical solution.

When subexcavation is selected, consideration must be given to the availability and quality of borrow replacement material and the final disposition of the subexcavated material. If it is economically feasible, the salvage and/or treatment of the existing surfacing should be evaluated for use in finishing the new subgrade.

The August 2000 memo states, “In all cases where proposed grades require subexcavation, there should be soils information and Geotechnical recommendations with subexcavation limits.” This remains a requirement.

Constructability Treatment

There may be instances where the in-place soils “R” values are sufficient for the designed surfacing section, but not sufficient to carry construction loading. It is important to remember that on some routes, the construction loads may be the heaviest loads that the road will experience during its design life. Whether or not the in-place soils are capable of supporting construction loading is a function of soil class and liquidity index. The Geotechnical Section can provide guidance in this area.

One possible solution may be the use of geotextile and/or geogrid at the new subgrade elevation. This would provide a construction platform for placement of the surfacing section.

With some soil types, the addition of lime or cement may be an option for stabilizing the subgrade enough to support construction loading. This would be contingent on Geotechnical recommendations.

If there is a significant time gap between the soil survey and construction, which is often the case, and no upgrades have been performed on the road during this time, we should assume that the in-place moisture contents will increase due to cracking and infiltration

of water. For this reason, if the liquidity index is marginal based upon the original soil survey, there is a high probability that the soils will be unstable at the time of construction.

In summary, if excavation of the PTW is required, a fundamental requirement to ensure that correct design assumptions are made is to ensure that sufficient soils survey information is available. Geotechnical recommendations are paramount in determining, based upon in-place “R” values and liquidity index, what options are available. It is impossible to envision all of the possible scenarios that may be encountered when working with PTW subsoils, and the possible solutions to them. This memo is to serve only as a guide to help with your decision-making.

JM:ld

copies: James Walther, PE
 District Administrators
 District Construction Engineers



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark Wissinger, P.E.
Construction Engineer

Date: March 10, 2004

Subject: Quality Assurance

This Construction memo is to clarify the role the Quality Assurance (QA) program plays in our job as contract administrators and how that differs from a Quality Control (QC) program that is the contractor's responsibility.

A primary function of a QC program is to identify and correct deficient materials before they are permanently incorporated into the work. Currently, contractors are often relying on our QA system to provide this function. Our specifications do not expressly prohibit this practice, nor do they clearly identify the requirements of an acceptable QC program. While we are undoubtedly receiving lower bids on a program-wide basis by contractors relying on us to provide this function, and not including the costs to monitor production in their bids, there is danger when this is done. When contractors rely on our QA system to identify deficient material, large quantities of inferior quality material can be incorporated into the work if we are not timely in our testing. We must recognize that in most instances the costs associated with having to prematurely replace deficient material that was accepted at a reduced cost, does not begin to be covered by the price reductions we assessed.

Our current specifications recognize that contractors may be relying on our QA testing to monitor quality, and have mechanisms in them to prevent the incorporation of large quantities of deficient materials into the work. One such mechanism is in Subsection 105.03.2 as follows:

Immediately halt production following written notification when either of the following has occurred:

- 1. Three consecutive lots for a contract item have an individual P value of 5 or more;*
- 2. Beginning with the second lot, when three tests within one lot have one or more elements outside the specification bands and the total P value for the lot is 5 or more.*

Make adjustments to bring the product within the specification limits before resuming production. The Contractor does not have the option of accepting a price reduction in lieu of producing specification material. Continued production of non-specification material is prohibited.

Contained within this contract language is the requirement that we perform QA testing and provide those test results to the contractor in a timely fashion. This is an important step to assure the contractor is made aware of deficiencies within the work and takes corrective action to fix the problem, particularly when they are relying on our QA testing to control quality.

For this reason it is unacceptable to stockpile QA samples for later testing. In the case of aggregate surfacing in particular, gradation testing, QA evaluation, and notification to the contractor of those QA test results, should take place as quickly as possible. QA testing and evaluation should take place no later than their completing placement of the next lot, unless it can be documented the delay to sampling or testing of the material is caused by the contractor or beyond the Department's control. Project staffing is within our control, and is not normally an acceptable reason for delaying QA testing and evaluation. We should view QA testing as a high priority for the reasons previously mentioned, and make personnel assignments accordingly.

We are in the process of reviewing our QA/QC specifications, with the goal of bringing them up to the current state of the practice on a national level. This is a large project and will take some time. Our expectation is that this review will result in substantial changes in our specifications, and a clearer definition of roles and responsibilities. Until this is accomplished we must recognize the current practice and contract requirements, and perform our QA testing in a timely manner.

What is considered an acceptable adjustment is not defined in Subsection 105.03.2. There could be countless acceptable and non-acceptable adjustments depending on the material and the individual contractor's capabilities. The Project Manager has within their discretion the determination of what is, and is not, acceptable. Insist upon a written plan of the proposed adjustment from the contractor. Insure that they follow the plan, and document the situation.

Costs associated with traffic control, water for dust control, or any other pay item required for the contractor to make adjustments to bring a material back into specification are to be borne by the contractor. We will provide additional QA testing at no charge to the contractor, however we will not suspend contract time for adjustments.

There have been questions about when QA price reductions or incentives were to be placed on progress payments. Subsection 105.03.3 C., which was supplemented on 2-1-04, states:

Quality incentive allowances will be used to offset any price reductions. Any quality incentive allowance remaining after all price reductions have been deducted will be paid as a lump sum when all work on the item is complete.

The intent of this contract requirement is to minimize the possibility of negative progress payments, which are difficult from an accounting standpoint to deal with, and to treat discrete items of work as a whole. For any given item in the Schedule of Items, which is subject to QA price reductions or incentives, no QA payment or price reduction is to be assessed in a progress payment until that item of work is complete. Until that item of work is complete, the contractor should be made aware of the accumulated QA adjustments for each item with each progress payment.

In order to ensure that the QA evaluation performed on any given material is

statistically valid we must witness the contractor taking the samples at the appropriate random intervals. Failure of the contractor to take the samples at the required interval is cause for a shutdown notice. It is the contractor's responsibility to take the samples in accordance with approved techniques. If the contractor is clearly not using proper technique in their sampling methods, our responsibility ends with documenting the improper technique and alerting the contractor in writing of what we have observed. If samples are clearly being taken in an unsafe manner, we will notify the contractor to immediately stop production until the safety issue is addressed, and samples can be taken safely at the proper interval. The Project Manager will determine what is, and is not, an acceptable solution to address safety concerns. Insist upon a written plan of the solution from the contractor. Ensure that they follow the plan, and document the situation.

There has been some confusion about the intent of the Special Provision entitled, PRICE REDUCTION CALCULATION. This specification is intended to lessen the effect upon the Department of substantial unbalancing of bids, which is done with the intent of reducing the contractor's exposure to price reductions on items subject to QA evaluation. The Base Unit Prices found in this specification will vary based upon the estimated cost of the item on any given project. Please note that this Special Provision merely supplements Subsection 105.03.2, it does not rescind any portion of it. Just because a contract item does not have a Base Unit Price specified does not mean that it is not subject to QA evaluation and price reductions or incentives. In the case that an item is not listed in this Special, but is subject to QA, the evaluation and subsequent incentive or price reduction would be based upon the unit bid price.

This memo is rescinded five years from the date of issuance if not updated. If you have questions please contact me.

cc: Construction Administration Services Bureau
Construction Engineering Services Bureau
Contract Plans Bureau
Materials Bureau
FHWA
District Construction Engineers
District Construction Operations Engineers
File



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Matthew R. Strizich, PE - Materials Engineer

Date: July 6, 2005

Subject: R-Value Testing of Finished Subgrade

Sampling materials in the top two feet of subgrade for soil classification and R-value is required under Subsection 28 of MT 201- 04 Sampling Roadway Materials. Listed below is the guidance provided under the test method for the testing frequency and types of testing required.

28 Field Construction Sampling:

- 28.1** This procedure applies to material used for cut and fill sections within the R/W limits of the project.
- 28.2** Samples for soil classification and "R" value shall be obtained from the top 2 feet (0.6 meters) of the sub-grade. Sample frequency will be one sample every 1000 feet (305 meters) for projects with 3 or more cuts or fills per mile. If the project has fewer than 3 cuts or fills per mile the sample distance is extended to 2000 feet (610 meters).
- 28.3** District/Area lab personnel will determine the soil classification. If the soil class is not equal to or better than that used by the Surfacing Design Unit to determine the typical section, then samples for "R" value determination are to be submitted to the Materials Bureau in Helena.

NOTE: These samples are as a design check only. Sampling every 1000 feet (305 meters) is a general guide and some discretion should be used. For example, it may be advisable to take more samples in fill sections than cut sections, or if there is an obvious change in the soil conditions or soil class, etc. No samples will be required for typical sections with a design "R" of 5 or less or for soils classified as A-6 or A-7.

The guidance does not differentiate between Special Borrow used to construct the top two feet of subgrade versus unclassified excavation or borrow. Special Borrow used in the top two feet of subgrade and specified and accepted based on R value testing does not need to be sampled and retested in accordance with subsection 28 of MT 201-04. The original borrow source acceptance is adequate verification of the material quality.



Department of Transportation

PO Box 201001

Helena, MT 59620-1001

Construction Memorandum

To: District Materials Supervisors

From: Matthew R. Strizich, P.E. – Materials Engineer

Date: January 6, 2006

Subject: Retaining and Retesting Density Cores

This Construction Memo is to provide guidance for retaining and retesting plant mix cores used for density acceptance.

Retain all failing cores for a minimum of 14 calendar days from the date all paving is completed on a project or 14 calendar days from the date when one of the following criteria is met.

- 30,000 tons (Metric or English) of plant mix surfacing has been produced since the test results were provided to the contractor and the results have not been questioned.
- Paving on the project has been suspended for the construction season.

Passing cores must be retained for a minimum of 7 calendar days from the date the test results are provided to the contractor.

Requests for retesting of cores must be made through the EPM along with justification for the request. Do not retest without valid justification. The cores should be retained until all issues have been resolved whenever a contractor questions the original test results.

Store all retained cores in a manner and location where the physical properties of the core will not be altered.

Use the original test results for all QA calculations unless retesting indicates the original results were invalid. Failure to retain the cores or cores damaged after the original testing does not invalidate the original test results.

For assistance or questions related to this subject, please contact the Scott Barnes or myself.

This memo supersedes any previous memos on this subject.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: Distribution

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: December 19, 2007

Subject: Standard Specification Section 409 Seal Coat Revisions

This memorandum updates the previous construction memo dated June 14, 2004, with the subject title Standard Specification Section 409 Seal Coat. Effective September 1, 2007 revisions have been made to the Section 409 Seal Coat Standard Specification. The intent of this memorandum is to clarify changes to the specification and their effects on other areas within MDT.

Revisions to the specification include:

➤ Subsection 409.03.3 Limitations and Recommendations

A recommendation statement has been added giving consideration to the release of light organics from bituminous products. A minimum 72 hour curing period is recommended between the placement of plant mix bituminous surfacing, fog seal, and seal coat. An incomplete cure could result in changes in the chemistry of the asphalt therefore affecting the adhesive properties of the bituminous product.

➤ Subsection 409.03.6 Application of Fog Seal

When paving and seal coat placement are performed in the same calendar year, this specification now requires a fog seal prior to the application of the seal coat. This applies to Grade S and Grade D plant mix surfaces.

For a period of time after placement, Grade S and D mixes typically exhibit high surface void areas. The purpose of a fog seal is to fill a portion of the surface voids, resulting in more seal coat oil remaining on the plant mix surface to embed chips.

In cases when the application of a seal coat is delayed until the following season, a fog seal is not required. The kneading effect of vehicle tires and application of sanding materials serves to reduce the surface void area.

In either case, it is strongly recommended that plant mix surfaces be evaluated prior to seal coat application. Areas of concern, such as those exhibiting localized segregation should be thoroughly documented.

Fog seal emulsions (CSS-1 & SS-1) will continue to be diluted one part water to one part emulsion, for quality control purposes, the cut will take place at the point of manufacture. When an emulsion supplier's product is not listed on MDT's Qualified Products List, field personnel will obtain samples as outlined in MDT Materials Manual Section MT-601 and note on the sample container that the product has been diluted.

Bituminous materials used for fog seal are measured and paid separately. Unit bid items and basis of plan quantity information will be provided in the plans.

➤ Subsection 409.03.7 Application of Seal Coat Materials

To clarify the intended location of longitudinal joints, the following language was added:

“Locate longitudinal joints at the centerline or lane line. Obtain approval from the Project Manager to construct the joint at any other location.”

➤ Subsection 409.03.8 Warranty

With this revision, the warranty period for all projects has been extended to the first Wednesday in December of the same calendar year. This will simplify the warranty evaluation process for Project Managers and ensure the seal coat has been subjected to cooler temperatures prior to warranty expiration.

Throughout the warranty period, MDT personnel must carefully document (photos, video, diary) the progression of the seal coat cure. Frequency and type of documentation will be dictated by the number and severity of potential problem areas.

At the end of the warranty period, the EPM will facilitate and conduct an on- site inspection. Based on findings from this inspection, the Project Manager will send a letter to the Contractor stating whether or not repairs are required and at which locations. Copies of this letter will be sent to the District Construction Engineer, Materials Bureau, Construction Engineering Services Bureau, Construction Administration Services Bureau, and the project file.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark Wissinger, P.E., Construction Engineer

Date: June 9, 2006

Subject: Construction Memo – Subsection 104.02.3 Significant Change in the Character of Work

The purpose of this Construction Memo is to clarify the intent of changes made to this Subsection, and to provide guidance on its application.

Major items have been redefined (Subsection 101.03) as individual bid items having an original contract value equal to or exceeding 5 % of the total original contract amount. Previously, major items were defined as being 10 % of the total original contract amount. This change was made to recognize the major increase in average contract size we've experienced, and the possible impact of changes on items of work which did not meet the original 10 % requirement. These impacts can be significant for both the contractor and MDT.

Additionally, unit prices of non-major items of work (those items less than 5 % of the original contract amount) may now be subject to adjustment when there is a significant change (Subsection 104.02.3 C.). Previously, unit prices of non-major items were not subject to adjustment. This change was made to recognize the possible impact of changes on non-major items of work to both the contractor and MDT.

If there is a significant (more than 50 %) decrease in quantity, it may not be possible for the contractor to recover fixed overhead costs contained within the unit price of the item of work. Impacts by significant underruns can be more serious for subcontractors performing work on a single or limited number of items if fixed overhead costs are contained within the unit bid price. Fixed overhead rates obtained through a review of subcontracts, claims and sequestered bid documents have typically averaged approximately 20 % of the unit price on non-major items. This percentage is an average with the actual percentage dependant on the item of work being performed, and the manner in which the bid is structured. Typically, the percentage of fixed overhead is inversely proportional to the original item quantity; the smaller the original quantity, the larger the possible percentage of fixed overhead in the unit price.

If the final quantity of a non-major item is between 50 % and 150 % of plan quantity there will be no adjustment made. When a non-major item underruns by more than 50 %, it is now correct per specification to redistribute the un-recovered overhead on the unit price of the remaining quantity.

Likewise, when a non-major item increases by more than 50 %, the unit price of the quantity above 150 % of the plan quantity will be decreased by the percentage of fixed costs recovered in the original bid quantity. In the absence of documentation, the amount of decrease in the unit price

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is to be 20 % for that quantity in excess of 150 % of the plan quantity. The following example should help to illustrate how adjustments are to be made:

Example 1;

The plan quantity for clearing and grubbing (201 310 000) is 3.300 hectares, and is a non-major contract item in this example. The awarded unit price is \$5,250.00/hectare. The documented cost breakdown for this item is:

Equipment (includes maintenance & fuel) = \$2,001.25/hectare

Labor = \$1,812.50/hectare

Profit = \$465/hectare

Fixed overhead (mobilization, home office overhead, insurance, bond, etc.) = \$971.25/hectare

The actual quantity of measured clearing and grubbing is 1.500 hectares (underrun of 54.5%). The amount of fixed costs that the contractor is entitled to recover in this case is:

$3.300 - 1.500 \times \$971.25/\text{hectare} = \$1,748.25$

This amount should be redistributed over the actual quantity of work performed to arrive at the new unit price:

$\$1,748.25/1.500 + \$5,250.00 = \$6,415.50/\text{hectare}$

Had the contractor placed the overhead (\$971.25/hectare \times 3.300 = \$3,205.13) in the Mobilization (192 000 000) item, and provided an initial bid price of \$4,278.75/hectare, there would be no adjustment, since the contractors fixed costs would be covered and paid within the Mobilization item. The \$4,278.75/hectare unit price would be the correct unit price for the quantity in excess of 150 % (greater than 4.950 hectares) for the \$5,250.00/hectare bid price as it is structured in this example.

Typically, fixed overhead costs constitute a lower percentage of the unit price of major contract items. Fixed overhead rates obtained through a review of subcontracts, claims and sequestered bid documents have typically averaged approximately 10 % of the unit price on major items.

If the final quantity of a major item is between 75 % and 125 % of plan quantity there will be no adjustment made under any circumstance. When a major item underruns by more than 25 %, it is correct as per this specification to redistribute the un-recovered overhead on the unit price of the remaining quantity. Likewise, when a major item increases by more than 25 %, the unit price of the quantity above 125 % of the plan quantity will be decreased by the percentage of fixed overhead. In the absence of documentation, the amount of decrease in the unit price is to be 10 % for that quantity in excess of 125 % of the original plan quantity. The following example should help to illustrate how adjustments are to be made:

Example 2;

The plan quantity for unclassified excavation (203 100 000) is 400,000 cubic meters, and unclassified excavation is a major contract item in this example. The awarded unit price is \$5.00/cubic meter. Fixed overhead costs (mobilization, home office overhead, insurance, bond, etc.) are estimated by the contractor to be 10%, or \$.50/cubic meter, but 5%, or \$0.25/cubic meter has been placed in the Mobilization (192 000 000) item. The documented cost breakdown for this item is:

Equipment = \$1.00/cubic meter

Labor = \$1.375/cubic meter

Fuel & haul (0.5km average) = \$1.00/cubic meter

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Water, compaction & grade control = \$1.00/cubic meter

Profit = \$0.375/cubic meter

Fixed overhead (contained within the unit bid price) = \$0.25/cubic meter

During the course of the work, significant additional laybacks in cut slopes are required for slope stability. The amount of the additional excavation is 150,000 cubic meters. The project staff is able to find areas within the project limits where the excess can be disposed of, and the average haul for the excess material is 0.25km. The adjustment for that quantity that is in excess of 125% of plan quantity (50,000 cubic meters) should be:

\$5.00 - \$0.25 fixed overhead - \$1.00 water, compaction & grade control – \$0.50 fuel & haul (haul is only one-half the average) = \$3.25/cubic meter.

Labor and equipment costs arguably could be lessened by the increase in efficiency for the disposal of the excess, but this could be offset marginally by the fuel & haul calculation, which may not be a straight ratio. In this case the unit price of \$3.25/cubic meter for the 50,000 cubic meters would be acceptable.

The 20 % overhead used for non-major items, and the 10 % overhead used for major items, are averages obtained through a review of subcontracts, claims and bid documents. Actual cost impacts caused by significant increases or decreases can be greater, or less than these figures, and may be affected by costs other than fixed overhead. Historical bid prices for the item subject to adjustment should be reviewed using the DSS database query. Other documentation and tools that can be useful is subcontracts, bid documents supplied by the contractor and Estimator models, which can be acquired from the Contract Plans Bureau. If you would like additional information, or guidance on this subject, please contact this office.

copies: FHWA
District Administrators
District Construction Engineers
District Construction Operations Engineers
Engineering Project Managers
Construction Administration Services Bureau
Construction Engineering Services Bureau
Contract Plans Bureau

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Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: All Engineering Project Managers, District Engineering Services
Supervisors,
District Construction Engineers, and District Lab Supervisors

From: Matthew R Strizich, PE


Date: February 22, 2008

Subject: WAQTC Training Requirements for use of Site Manager

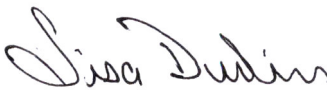
Everyone,

Full implementation of SiteManager construction begins with projects in the March letting and materials pilot projects are due to start this spring. With the implementation of SiteManager come some new requirements. One change everyone needs to be aware of is that in order for a SiteManager user to enter test data into the program, that user must receive training and must be properly certified to do so. Simply put, if you are going to enter test data in SiteManager, you must have the applicable up-to-date WAQTC or ACI certification(s) on record. Testers are currently required to be properly certified in the testing they are performing so this is not a new requirement. In addition, field personnel using the nuclear densometer must have an up-to-date certification in order to enter density test information.

Jeff Rayman is out in the Districts right now teaching initial and refresher courses for the WAQTC modules. Please make sure that your people are up-to-date on their certifications. If they have an out-of-date certification, SiteManager will recognize this and they will not be allowed to enter test results and they should not be performing the testing on those items anyway.

	Montana Department of Transportation	Date Issued: May 6, 2008
CONSTRUCTION MEMO		Date Effective: May 6, 2008
		Related Specifications: All
Subject: Specification Revision Process		

To: Distribution

From: Lisa Durbin, P.E., 
Construction Administration Services Engineer

The development and construction of a high quality, cost-effective transportation project requires clear, concise and effective contract language and specifications. To help achieve this, the Construction Administration Services Bureau recently formed the Standards Committee with the goal of ensuring uniformity and compliance with standard MDT practices in all contract language. The committee is comprised of representatives from Construction, Preconstruction, Maintenance, Materials, and the Districts.

The Standards Committee has approved the process to be followed for updating or revising:

- Standard Specifications
- Standard Special Provisions
- Detailed Drawings
- Materials Manual

Effective immediately, all revisions to the above listed items must follow this process. The process, which includes the procedure for submitting requested changes, is available on the MDT Internet:

http://www.mdt.mt.gov/other/const/external/proposed_spec_changes/SPEC_REVISION_PROCESS.PDF



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: Distribution

Lisa Durbin, P.E.,
Construction Engineer

March 29, 2006

Subject: Subcontract Requirements

This memo is to clarify when a subcontract, consented to by MDT, is required on a project. This supersedes all prior memoranda on the subject.

A subcontractor is any person or entity, to which a Contractor subcontracts, assigns or otherwise disposes of any part of the work. "Work" is the furnishing of all resources necessary to complete the project, and includes labor, equipment and materials.

Where an entire item is subcontracted, the percentage of the total work subcontracted is based on the contract item unit price. When a portion of an item is subcontracted, the percentage of the work subcontracted will be based on either the subcontract item unit price or on an estimated percentage of the contract item unit price.

A subcontract is required for any person or entity on the project site, or for any work dedicated to the project. If the person or entity is included on the prime contractor's payroll, a subcontract for the work is not required.

Examples of work that require a subcontract include:

- Any contract item or portion of a contract item performed by a contractor other than the prime contractor
- Crushing operations at a site dedicated to the project
- Operations physically located on the project site
- Extra work added by a change order
- Consultant services on the project site hired by the prime contractor or a subcontractor

Examples of work that do not require a subcontract include:

- Commercially supplied materials
- Equipment rentals
- Owner/operators of haul trucks

Change ordered work or work performed by a sub-subcontractor are not included in the subcontract percentage. Specialty work also is not included in the subcontract percentage, but this work should be identified at the time the subcontract is submitted for processing. All other subcontract requirements are still applicable.

In many cases, subcontract requirements are confused with payroll requirements. These two items are closely related, but not identical. Some items that require subcontracts do not require payrolls, as well as the reverse. If you have any questions, please call the Civil Rights Bureau regarding payroll questions and call the Construction Administration Services Bureau regarding subcontract questions.

copies: District Administrators
 District Construction Engineers
 Engineering Project Managers
 Mark Wissinger, P.E.
 Construction Administration Services Bureau
 Construction Engineering Services Bureau
 Steve Garrison, Legal
 Vicky Koch, Civil Rights
 Helen Varcoe, Internal Audit
 MCA
 FHWA



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: May 5, 2005

Subject: Temporary Traffic Control Signals Guidance

This Construction Memo develops guidance for the uniform use and application of temporary traffic control signals. Please find the subject attachment.

For assistance or questions related to this subject, please contact the District's Construction Engineering Services Reviewer or myself.

MDT Guide for the use of Temporary Traffic Control Signals
5-5-05

This guide provides a summary of the general requirements from the Manual of Uniform Traffic Control Devices (MUTCD) on temporary traffic control signals in Part 1 and the Department's recommendations for the use of portable traffic control signals on construction projects in Part 2.

Part 1
MUTCD

Reference the MUTCD for the complete information on Temporary Traffic Control Signals, below is a summary of information.

2003 MUTCD Section 4D.20 Temporary Traffic Control Signals

“Temporary traffic signals are for specific purposes such as one lane, two way facilities in temporary traffic control zones, or for a haul road intersection.

The signal shall:

- Meet the physical display and operational requirements of a conventional signal.
- Be removed when no longer needed.
- Be placed in flashing mode when not being used if it will be operated in the steady mode within 5 working days; otherwise it shall be removed.
- Be placed in flashing mode during periods when it is not desirable to operate the signal, or the signal heads shall be covered, turned, or taken down to indicate that the signal is not in operation.

A temporary traffic control signal should be used only if engineering judgment indicates that installing the signal will improve the overall safety and/or operation of the location.

Temporary traffic control signals should not operate longer than 30 days unless associated with a longer-term temporary traffic control zone project.

2003 MUTCD Chapter 4G. Traffic Control Signals for One-Lane, Two-Way Facilities

Adequate means, such as interconnection, shall be provided to prevent conflicting signal indications, such as green and green, at opposite ends of the section.

When in flashing mode, the signal indications shall flash red.

Adequate time should be provided to allow traffic to clear the narrow facility before opposing traffic is allowed to move. Engineering judgment should be used to determine the proper timing for the signal.

2003 MUTCD Section 6F.80 Temporary Traffic Control Signals

Temporary traffic control signals are typically used in temporary haul road crossings; temporary one-way operations along a one-lane, two-way highway; temporary one-way operations on bridges and intersections.

One-lane, two way vehicular traffic flow requires an all red interval of sufficient duration for road users to clear the portion of the temporary traffic control zone controlled by the traffic control signals. Safeguards shall be incorporated to avoid possibility of conflicting signal indications at each end of the work zone.

Where pedestrian traffic is detoured to a temporary traffic control signal, engineering judgment should be used to determine if pedestrian signals or accessible pedestrian signals are needed for crossing along an alternate route.

The supports for temporary traffic control signals shall not encroach into the minimum required width of a “pedestrian access route” of 1200 mm (48”) or an “alternate circulation path” of 900 mm (36”).

Temporary traffic control signals should only be used in situations where they are preferable to other means of traffic control, such as changing the work staging or work zone size to eliminate one-way vehicular traffic movements, using “STOP” or Yield signs, and using warning devices alone.

Factors related to the application of temporary traffic control signals include;

- Safety and road user needs;
- Work staging and operations;
- The feasibility of using other strategies; (flaggers, providing two-lanes, detouring road users, including bicyclists and pedestrians;
- Sight distance restrictions;
- Human factors such as lack of driver familiarity with temporary traffic signals;
- Road user volumes including roadway and intersection capacities;
- Affected side streets and driveways;
- Vehicle speeds;
- Placement of other TTC devices;
- Turning restrictions;
- Pedestrians;
- Adjacent land uses;
- Full or part time operation;
- Power failures or other emergencies;

Temporary traffic signals not in use should be covered or removed.

Additional references are MUTCD Typical Applications #12 (Figure 6H-12) and #14 (Figure 6H-14).

Part 2

MDT Guide for Temporary Traffic Control Signal Use

General:

Temporary traffic control signals are preferable to flaggers for long term work activities and work that would require flagging at night.

Assure all advance warning signs related to the signal are in the traffic control sign series and that it meets current department and MUTCD standards.

Provide a well defined (delineated) traveled way between the signals that equipment does not encroach on during the work.

Reference the MUTCD Typical Applications #12 (Figure 6H-12) and #14 (Figure 6H-14) until a Detailed Drawing is developed for Temporary Traffic Control Signal application.

When the contractor plans on using temporary traffic control signals, these signals are to be included in their traffic control plan that is submitted.

Do not use temporary traffic control signals for temporary haul road crossings.

Application of Temporary Traffic Control Signals:

Rural Applications:

Use temporary traffic control signals on projects where each end of the controlled section of roadway is visible to both directions of travel. Exceptions can be made where a vehicle traveling a short distance past the signal (approx. 200 feet), can see the signal controlling the opposing traffic.

Place a temporary stop bar (or temporary painted stop bar) at least 12 m (40 feet) in advance of the temporary signals. Remove the stop bar when the signal is not in operation or has been removed.

Verify that the placement of the STOP HERE ON RED sign does not obscure the signal face. The STOP HERE ON RED sign should ordinarily be placed at least 40-feet in advance of the signal.

Set the signals on fixed time. Monitor traffic queues at the signals and adjust the signal time appropriate to the queues.

In heavy or steady traffic, vehicles approaching the back of a recently departed queue may see a red indication and be uncertain about stopping or joining the departing queue. Consider adding a flagger to assist and serve for walk back. Assure the flagger's vehicle is outside the clear zone. Flaggers may be more appropriate to control traffic in those situations rather than signals.

Temporary signals may be used on non-interstate chip seal projects; include a walk-back flagger when the traffic queue is high, i.e. more than 10 vehicles stopped at the station 50% of the time. These signals should improve safety for nighttime operations.

Urban Applications:

When temporary traffic signals are used at urban intersections, place the signals as close to the intersection as possible to assure a clear view of all intersection approaches.


Place the temporary stop bar meeting the MUTCD.

If the signal location will not permit traffic a clear view of all intersection approaches, use flaggers or stop signs.

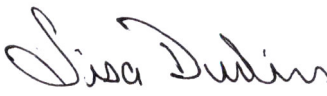
In urban areas consider the pedestrian movements at intersections. Typically, temporary signals do not provide control for pedestrians. At high use pedestrian intersections a flagger may be more appropriate to control both vehicular and pedestrian movements. Signing an alternate pedestrian route to a nearby intersection may also be appropriate based on the location, work activity and duration.

Follow-Up Items:

1. Review this guidance after the 2005 construction season and update it to incorporate “lessons learned” in the use of temporary traffic control signals.
2. Develop detailed drawings for the use of temporary traffic control signals.

 <p>Montana Department of Transportation</p> <p>CONSTRUCTION MEMO</p>	Date Issued: February 21, 2008
	Date Effective: February 21, 2008
	Related Specifications: 105.08.1
Subject: Use of Contractor Survey Equipment	

To: Distribution

From: Lisa Durbin, P.E., 
Construction Administration Services Engineer

The Standard Specifications allow the contractor to use GPS type machine grade control, and some contractors regularly use GPS survey equipment while constructing MDT projects. There have been cases when MDT personnel utilize readings taken from the contractor's GPS equipment for use as grade checks. This practice is expressly prohibited.

There are two key issues. The first is that, under federal regulation, MDT cannot use contractor tests or measurements for determination of payment. Under the scenario described above, that is essentially what is happening. Regarding GPS technology, there are periods during each day when the satellite coverage (geoid model) over Montana and the entire Rocky Mountain region, prevents accurate readings. The second issue is that by using this practice, MDT is not performing what is considered an independent grade check, and may be relying on inaccurate information. Therefore, independent measurements must be obtained by department personnel using department furnished survey instruments.

Recently, MDT has made large monetary investments in survey equipment, including data collectors and robotic total stations. Crews have demonstrated increased efficiencies with this equipment, so department caused delays while performing grade checks should not be an issue. Each district will be getting one additional robotic total stations in the immediate future, and the Survey Issues Committee is working towards the goal of obtaining additional robotic total stations and GPS survey equipment.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: District Construction Engineers

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: September 17, 2007

Subject: Value Engineering Proposals

This Construction Memo provides a uniform process for the submission and processing of Value Engineering Proposals in accordance with Standard Specification 104.08.

For assistance or questions related to Value Engineering Proposals, please contact the Construction Engineering Services Engineer or your District CES Reviewer.

GUIDANCE FOR EVALUATING VALUE ENGINEERING PROPOSALS

A Value Engineering (VE) Proposal is typically an improved construction technique, an alternative material, or other innovation originated by the Contractor that would be expected to result in a cost savings to the project. The function and quality of the project must be maintained or enhanced. Net cost savings is shared between the Contractor and the Department.

The Construction Engineering Services (CES) Bureau will be responsible for processing Value Engineering (VE) proposals, according to Standard Specification 104.08, and for coordinating any reviews and investigations performed by other involved Divisions and Bureaus. These Divisions and Bureaus will provide technical advice and recommendations in their functional area of expertise.

VE proposals should be evaluated in a timely manner and every reasonable effort should be made to complete the response within the time frame given in the proposal. If the time frame given appears to be unreasonably short, the EPM should contact the contractor, state that the time frame appears to be unreasonable and request the contractor direct MDT to either proceed with the proposal under a revised date or rescind the proposal.

The District CES Reviewer will be the point of contact and will be responsible for coordinating the review of the proposal and tracking progress.

The Construction Administration Services Bureau's Change Order Specialist (Traci Steen) will maintain a database containing pertinent proposal information.

The Construction Engineering Services Bureau will share lessons learned in order to incorporate innovative practices into future MDT projects, either at the planning phase, or into future VE Proposals.

Pre-Bid Information

The Value Engineering concept is based on savings generated from changes to the contract work. It is not intended to provide a competitive advantage in the bidding process.

Post Award Information

Contractors, in many cases, will be concerned about incurring the expense of developing a proposal that could ultimately be rejected.

The Department can only make a commitment on a proposal submitted in accordance with contract provisions. Any comment on tentative proposals should be confined to general concepts. Care must be taken to make it understood that such comments do not constitute an endorsement or a commitment that the proposal would be accepted.

Evaluation

VE proposal evaluations are a two-step process. The initial step is the Preliminary Review. The purpose of the Preliminary Review is to screen proposals to determine if a detailed investigation is warranted. Costs incurred by the Department during the Preliminary Review stage will not be charged to the Contractor.

Proposals found to have a reasonable possibility of meeting service requirements and being cost effective will be advanced to the Detailed Review stage. The Detailed Review stage will include analysis and investigation. Costs incurred by the Department during the Detailed Review stage will be shared equally by the Department and the Contractor.

The following generally would not qualify as a VE Proposal and should be rejected:

- An alternate construction method or idea that has been previously considered (such as in the design phase of project development)
- Deletions of pay items
- Deletions of specifications

Preliminary Review

1. The District will notify the following personnel via email upon receiving of a proposal:
 - District's CES Reviewer
 - Change Order Specialist (Traci Steen)
2. The District will review the proposal for form, content and completeness in accordance with Standard Specification 104.08. This will include overall concept, cost data, and time allowed for evaluation.
3. The District will then send the proposal to the Construction Engineering Services Reviewer, for a check of the District's Preliminary Review.
4. The Construction Engineering Services Bureau will transmit the proposal to involved Divisions and Bureaus and FHWA (on oversight projects) for Preliminary Review of the technical and functional aspects of the proposal. A statement of time available for the Preliminary Review will be included.
5. The involved Divisions and Bureaus and FHWA (on oversight projects) will make a Preliminary Review of proposal features that relate to their functional areas. This is intended only to be cursory review in order to determine if the proposal warrants detailed investigation and analysis. The Preliminary Review should only require sufficient detail to identify obvious problems in regard to design standards, service requirements, materials properties and other factors affecting performance and operation.
6. The results of the Preliminary Review from each functional area will be transmitted to the Construction Engineering Services Bureau. This will include a brief statement of significant problems, a recommendation as to whether or not a

detailed investigation is warranted, and a rough estimate of the time and cost required for Detailed Review.

7. The Construction Engineering Services Bureau will summarize and evaluate Preliminary Review reports and make a recommendation to the Construction Engineer. The Construction Engineer will make a determination to proceed with a Detailed Review or to reject the proposal.
8. For rejected proposals, the Construction Engineering Services Bureau will notify the District who will then notify the contractor, in writing, of the decision and the reasons for the rejection. The contractor will have the option of revising the proposal to answer the objections.

Note: Frequent and open communication between the EPM, CES, and other parties is essential and is strongly encouraged.

Detailed Reviews

1. The CES Bureau will notify the involved Divisions and Bureaus and FHWA (on oversight projects) to proceed with detailed investigations and of the time that is allowed. All time spent on this work should be tracked on timesheets using the activity number 065.
2. The purpose of the Detailed Review is to assure the essential functions of the project are not impaired. This may include re-design, design review, review of consultant designs, materials tests and evaluation, quantity calculations and cost estimates. This stage may include internal meetings and/or meetings with contractors and their consultants to clarify and negotiate solutions to problems.
3. Each of the appropriate Divisions or Bureaus will submit a Detailed Review report to the CES Bureau. Reports will include a recommendation as to whether or not the proposal should be accepted in whole or in part. Suggested modifications to make it acceptable should be furnished as appropriate. Reports should include recommended any changes to contract documents necessary to implement the proposal. Quantity changes and cost estimates should be supplied. An estimate of the cost and time required for any detailed re-design or plan revisions should be included.
4. The CES Bureau will compile the Detailed Review reports and provide a summary of findings and a recommendation to the Construction Engineer.
5. CES will produce a report on the 065 activity number, in order to determine the total cost incurred during the Detailed Review. The cost amount will be provided to the District Construction Engineer and Project Manager.
6. The Construction Engineer will determine whether or not to accept the proposal and will notify the District Construction Engineer of the decision by memorandum,

with a copy to the Project Manager. The District will then notify the contractor, in writing, of the decision.

7. For accepted proposals, the District will prepare a change order with any supporting documentation. The adjusted contract amount will reflect the estimated net savings from the VE proposal, less fifty percent of the Detailed Review cost. The change order will be submitted to the Construction Administration Services Bureau for approval prior to final processing.
8. For rejected proposals, the District will prepare a change order to document the cost sharing of the Detailed Review.

Department Expense to Evaluate and Implement

The costs to the Department incurred during the Detailed Reviews are to be shared equally by the contractor and Department.

These costs may include, but are not limited to:

- 1 Investigation and Review.
- 2 Re-Design or Design checks.
- 3 Quantity calculations and estimates.
- 4 Plan revision or preparation.
- 5 Laboratory sampling and testing for investigation.
- 6 Field surveys or re-surveys.

Increased costs to the Department associated with the implementation of Value Engineering proposals are also to be shared equally by the contractor and Department.

These costs may include, but are not limited to:

- 1 Additional inspection, testing, or surveys required to implement the proposal.
- 2 Any increased pay item quantities.
- 3 Increased road user-costs.
- 4 Increased traffic control costs.
- 5 Increased erosion control costs.

Example Calculation:

In this example, the contractor has proposed to replace the planned box beam guardrail with a new type of rail. The benefit is that it will reduce the amount of unclassified excavation on the project.

Detailed Review Costs	\$ 1,100
800 m ACME Type Guardrail	\$190,000
800 m Guard rail – box beam	- \$180,000
8000 cu m unclass excavation	- \$ 50,000
net savings	- \$ 38,900

change order amount = $50\% \times \$38,900 = \$19,450$ contract reduction

Templates

The following attached templates may be used in Value Engineering proposal correspondence:

- Memo template: CES Bureau's evaluation & recommendation to the Construction Engineer
- Memo template: VE acceptance/denial to DCE from Construction Engineer



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Kevin Christensen, P.E.
Construction Engineer

From: Paul Jagoda, PE
Construction Engineering Services Engineer

Date: February 6, 2003

Subject: (Project Number)
(Description)
Value Engineering proposal

Attached is a Value Engineering (VE) proposal from the prime contractor, _____, for the subject project, dated _____. The contractor has proposed to _____. A meeting to discuss the proposal was held on _____.

Those in attendance at the meeting were:

The meeting began with a general discussion of the merits of the proposal, and to determine if the criteria for a Value Engineering Proposal were met, as set forth in Subsection 104.08. Those criteria are, and the groups' findings were:

Service Life:

Economy of Operation: This proposal will provide a significant benefit in a number of ways. The net savings in _____ to the MDT, \$ _____, _____.

Ease of Maintenance: This proposal should have _____ effect.

Reliability: For reasons noted in the Service Life discussion, reliability would be enhanced.

Desired Appearance: This proposal should have _____ effect.

Safety: This proposal should have effect.

The following unit priced items are contained in this VE proposal:

Net Savings =

The recommendation from the Construction Engineering Services Bureau for the acceptance/denial of the subject Value Engineering proposal is

Cc: Construction Engineering Services Bureau
 Materials Bureau
 , District Administrator
 , District Construction Engineer
 , FHWA
 , District Design Supervisor
 , EPM
 Traci Steen
 MDT Consultant Design
 File-

CSB_104_08(VE_Proposals9-17-07)

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Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: <name>
District Construction Engineer

From: Kevin Christensen, PE
Construction Engineer

Date: February 4, 2008

Subject: (Project Number)
(Description)
Value Engineering Proposal

The Detailed Review of the subject VE proposal has been completed.

It has been determined that the proposal would be mutually beneficial to both the Department and the Contractor and is accepted with the following conditions/stipulations:

-
-
-

or

Based upon the results of the Detailed Review, the Department has declined to accept the proposal.

Please proceed with processing a change order for the subject VE.

Cc: Construction Engineering Services Bureau
, EPM
Traci Steen
File-

CSB_104_08(VE_Proposals9-17-07)

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- 9 -



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Memorandum

To: Distribution

From: Mark Wissinger, P.E., Construction Engineer

Date: August 5, 2002

Subject: Water for Dust Control

The question of accounting for the Water For Dust Control item has been brought to our attention. Specifically the question has been raised of when we do, or do not, pay for this item. Also, guidelines for the monitoring of quantities measured for payment has been requested. The two most applicable Specifications are Subsections 618.03.12 and 618.04.5 and read thusly:

618.03.16 Water For Dust Control. Furnish, haul, and apply dust control of water using tank trucks equipped with spray systems that uniformly distributes the water over the application area. Discontinue the watering as directed.

618.04.5 Water For Dust Control. Dust control is measured by the 1000 gallon (1 KL) unit used and accepted.

Measurement will be by the approved meter, load counter or by manual count of the number of loads of a known quantity applied on the roadway.

No measurement is made of water used other than for dust control for environmental compliance and convenience of the traveling public.

The language used here is fairly strong when describing the control MDT has on when water is to be measured for payment under this item, "No measurement is made of water used other than for dust control for environmental compliance and convenience of the traveling public." This specifically precludes payment for water used in embankment construction, gravel section construction, or any other operation.

The language also describes our control of how much is to be applied, "Discontinue the watering as directed." Section 105 describes in general the authority of the Project Manager/Engineer when determining how and when work is to be performed. Specifically, Subsection 105.12 addresses unauthorized work this way, "Work done contrary to instructions received, or beyond the plan limits, or extra work done without the permission of the Project Manager will not be considered for payment." From these specifications we draw the authority to direct when operations start, when operations cease, and what happens if they do not.

Measurement of the water eligible for payment can be by the several prescribed methods. If you are not comfortable that the quantities are being accounted for accurately by these methods, become so. Subsection 109.01 says; "The method of measurement and computations used in determining quantities of materials furnished and work performed are those methods recognized as conforming to sound engineering practice." Accuracy is a foundation of sound engineering practice. You are not obligated to accept quantities unless satisfied that they are being accurately accounted for. Remember Subsection 109.03; "Only those quantities of materials actually

incorporated into the final work and *accepted* (emphasis added) will be paid.” Also, Subsection 210.03.5 describes watering equipment. We do not have to accept equipment that leaks excessively.

The EPM is left with a great deal of discretion in determining what constitutes an environmental compliance situation or convenience of the traveling public. A good question to ask when determining if water is eligible for payment under this item might be; Who benefits the most from this application of water, residents and the traveling public, or the contractor? A good measure for determining when dust control is required may be the number of complaints you receive from residents and the traveling public. We of course have to be alert to those situations where dust may cause a hazard by reducing visibility, and address it quickly. Remember that all costs, including dust control, for maintenance of haul roads or other contractor facilities are not MDT’s responsibility.

In some instances where embankment will carry traffic for a period of days, or traffic gravel is in use, it may be more cost effective to use a dust palliative in place of water. It would be difficult to give firm guidelines for when this may be the case, but factors to consider would be relative bid prices, the period of time when a given lift will be exposed to traffic, or weather in general. We will be experimenting with the addition of dust palliative to gravel during pug mill operations. We believe there will be benefits in the form of better palliative dispersal and retention, stabilization of moisture contents, improved compaction operations, and possibly even improved densification. We’ll keep you informed on this matter. If you believe this would be an option on a project, work with the DCE to get this accomplished.

The level of allowable sulfites in dust palliative have been deliberately specified at a relatively low level due to our concerns with placing this material in close proximity to PCCP, CTB and RCP installations. The levels specified should not be detrimental to these materials, but it is something to remember.

We need to make sure the bid quantity for the Water for Dust Control item is sufficient, which will help to insure a reasonable bid price. Please make this an item you review at the preliminary plan stage. Since we have recently broken this item out from traffic control and made it a separate bid item, our knowledge of the quantities required is not fully developed. That is to be expected. I’d encourage you to make enquires with experienced personnel when making your estimates.

This memo is rescinded five years from the date of issuance if not updated. If you have questions please contact me.



Montana Department of Transportation
PO Box 201001
Helena, MT 59620-1001

Construction Memorandum

To: Distribution

From: Paul Jagoda, P.E.
Construction Engineering Services Engineer

Date: August 5, 2005

Subject: Review Process for Crashworthy Requirements for Work Zone Devices

Attached is the subject process the department will use to determine the acceptability of work zone devices, not commercially manufactured, for crashworthiness and use on MDT contracts.

Please contact Jim Wingerter or myself if you require additional information.

Crashworthy Work Zone Traffic Control Device Submission Process

8-5-05

Introduction: To assure work zone traffic control devices used on MDT construction projects meet NCHRP 350 crashworthy requirements the department will use the following process to review and approve contractor submissions on work zone traffic control devices.

General. Before a contractor submits information on work zone traffic control devices it is recommended that the contractor visit FHWA's web site; Questions and Answers About Crash testing of Work Zone Safety Appurtenances at <http://safety.fhwa.dot.gov/roadway>

Many of the devices previously tested and accepted by FHWA have patented components and therefore are proprietary. For devices crash tested at the expense of a private company, a vendor may use the acceptance letter written to the company that had the devices tested only if they: (a) purchase the devices from that company that paid for the crash testing (or another authorized distributor), or (b) obtain permission from that company to reproduce their design.

For commercially manufactured traffic control devices the contractor is to submit the manufacturer's certification to the project manager as required in the contract special provisions.

For traffic control devices not manufactured commercially and that have not been crash tested meeting NCHRP 350 requirements, the manufacturer of the work zone device is to submit the following information to the Montana Department of Transportation, Construction Engineering Services Bureau, attention Paul Jagoda.

Reference to identical design as used here means a device that is physically and materially the same as another device that has been certified or successfully crash tested. These devices are generic in design and have no proprietary elements in their design. Reference to nearly identical, as used here, means a device that is similar physically and materially to a device that has been successfully crash tested but the device differs enough that an engineering analysis, by an engineer specializing in this area of expertise, is required to determine its crashworthiness.

All devices not meeting either of the above statements and that are not commercially made and crash tested will require being successfully crash tested meeting NCHRP 350 requirements and furnishing the department the test results. All work zone traffic control devices are required to meet the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

Category I Traffic Control Devices.

Category I devices are defined as small, lightweight devices weighing less than 45 kg (99.2 lbs) known to be crashworthy from crash testing or years of demonstrable safe operational performance. These devices include plastic or rubber cones, tubular markers,

flexible delineators, and plastic drums with no lights, batteries, signs, etc. attached to the item.

Category I Submission Requirements:

Identical Design:

- Complete drawings showing dimensions for the device, including welds or connecting hardware as appropriate. Detail the dimensions of each element of the device. Furnish the total weight of the device.
- Provide a brief written description of the device detailing the materials of each component, what the device's application will be and why the device is necessary.
- Submit copies of evaluations or engineering analysis performed on similar devices the device is being compared to. Detail the similarities and differences between the devices.
- A declaration from the submitter that they consider the device to be crashworthy based on either being built to specification for a device for which crashworthiness has been validated by crash or surrogate testing or; is a type of device that is considered crashworthy on the basis of crash test experience with similar devices or years of demonstrably safe operational performance.

Nearly Identical Device:

Submit the information required for identical devices and provide an Engineering analysis performed by an engineer experienced in crash testing work zone devices.

Non-comparable device: It is not expected that a non-comparable device would occur in this category.

Category II Traffic Control Devices.

Category II devices are defined as small, light weight (less than 45 kg (99.2 lbs) devices that are not expected to produce significant vehicular velocity change, but may otherwise be potentially hazardous. All or parts of the device may be substantial enough to penetrate a windshield, injure a worker, or cause vehicle instability when driven over or become lodged under the vehicle.

Devices in this category would include barricades, portable sign supports, vertical panels, cones or barrels with lights attached, and intrusion detectors and alarms.

Category II Submission Requirements:

Identical Design:

- Complete drawings showing dimensions for the device, including welds or connecting hardware as appropriate. Detail the dimensions of each element of the device. Furnish the total weight of the device.
- Provide a brief written description of the device detailing the materials of each component, what the device's application will be and why the device is necessary.

- Submit copies of evaluations or engineering analysis performed on similar devices the device is being compared to. Detail the physical and material similarities and differences between the devices.
- A declaration from the submitter that they consider the device to be crashworthy based on either being built to specification for a device for which crashworthiness has been validated by crash or surrogate testing or; is a type of device that is considered crashworthy on the basis of crash test experience with similar devices.

Nearly Identical Device:

Submit the information required for identical devices and provide an Engineering analysis performed by an engineer experienced in crash testing work zone devices.

Non-comparable device: Have the device crash tested and provide documentation the device was successfully crash tested meeting NCHRP 350 requirements.

Category III Traffic Control Devices.

These traffic control devices weigh more than 45 kg (99.2 lbs) and are expected to cause significant vehicular velocity change or other harmful reactions to impacting vehicles. The department will require all category III devices to have been successfully crash tested meeting NCHRP 350 requirements and for the contractor to furnish certification to the project manager under the contract requirements that the device meets NCHRP 350.

Type III traffic control devices will require successfully passing crash tests meeting NCHRP 350 and the department being provided documents showing the device passed. The department will accept the successful crash test results manufacturer's certification for approval of category III devices.

Category IV Traffic Control Devices.

FHWA has postponed the decision date for trailer mounted work zone devices such as changeable message signs, flashing arrow panels, portable traffic signals, temporary work zone lighting, etc. FHWA plans to make a determination of a requirement for crash testing of these devices possibly October 1, 2006.

MDT encourages the use of crashworthy Type IV devices and for contractors to replace non-crashworthy Type IV devices when older Type IV devices have reached their service life

Once the department has reviewed the information it will respond indicating more time is necessary to review the information; accept the device for use on highway projects, or disapprove the device and require crash testing meeting NCHRP 350 requirements before the device can be used. In the later case if the device is in use, the device must be removed from service and replaced with crashworthy devices on all state projects within 10 calendar days of receipt of the department letter.

If the department determines the device is acceptable for use on MDT projects, the contractor may use MDT's letter as evidence that the device is acceptable for use in Montana.

If the device is later found to not provide acceptable performance in the field, the department may modify or rescind the acceptance letter and require crash testing.

Montana Department Transportation

Work Zone Safety and Mobility

September 2007





Montana Department
of Transportation

MANAGEMENT MEMO

Management Memo number: 07-03

Date issued: September 5, 2007

Date effective: September 5, 2007

Date revised: N/A

Subject: Work Zone Safety and Mobility

To: Engineering, Maintenance, and Rail, Transit & Planning Staff

From: Loran E. Frazier, P.E., Chief Engineer
D. John Blacker, Maintenance Administrator

INTRODUCTION

In September 2004, the Federal Highway Administration (FHWA) published updates to the work zone regulations in the Federal Register as 23 CFR 630 Subpart J. The updated rule is referred to as the **Work Zone Safety and Mobility Rule** and applies to all agencies that receive Federal-aid highway funding.

VISION

Plan, design, construct and maintain highway construction zones to optimize work zone safety and road user mobility while minimizing stakeholder and environmental impacts.

POLICY

The Montana Department of Transportation (MDT) will evaluate, design, and ensure the management of construction zone impacts and mitigating measures during planning, project development, construction, and maintenance operations for Federal-aid projects.

PURPOSE AND PROCEDURES

The purpose of this policy is to improve safety and mobility in construction zones by:

- Evaluating construction zone issues and impacts throughout planning and project development,
- Managing construction zones during construction and maintenance operations, and
- Assessing the process for continual improvement and uniformity throughout the State.

The MDT procedures apply to the Engineering Division (Preconstruction and Construction), Maintenance Division and Rail, Transit & Planning Division. The procedures establish criteria for defining significant projects, managing construction zone impacts, establishing related training plans, developing performance assessments, and improving project level processes to address work zone safety and mobility.

MDT will develop a Transportation Management Plan for projects comprised of strategies to manage construction zone impacts and mitigating measures. For significant projects the Transportation Management Plan consists of a Traffic Control Plan, Public Information Plan and Transportation Operations Plan.

Goals and Objectives, Procedures, and Guidelines are detailed in a separate document. The Work Zone Safety and Mobility committee, composed of representatives from the Divisions noted above, will meet regularly to assess and refine the procedures.

Montana Department Transportation

Work Zone Safety and Mobility

Goals and Objectives
Procedures
Guidelines

September 2007



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INTRODUCTION

In September 2004, the Federal Highway Administration (FHWA) published updates to the work zone regulations at 23 CFR 630 Subpart J. The updated rule is referred to as the Work Zone Safety and Mobility Rule (Rule) and applies to all State and local governments that receive Federal-aid highway funding. Transportation agencies are required to comply with the provisions of the Rule by October 12, 2007. The changes made to the regulations broaden the former rule to better address the work zone issues of today and the future.

The MDT Work Zone Safety and Mobility Policy provides an opportunity to increase safety for MDT employees, construction workers and the public while improving the mobility of the traveling public and our goods and services. A significant portion of the Guidelines and Procedures describes what we do now. This document expands on our processes and provides goals to measure how well we're providing for the safety and mobility through work zones. The Guidelines and Procedures are an opportunity to improve on our existing work. Many aspects of the procedures focus on safety, while other aspects focus on mobility. It is important to note that safety and mobility are integral; improved mobility through construction zones will improve safety.

Growing congestion on many roads, and an increasing need to perform rehabilitation and reconstruction work on existing roads already carrying traffic, are some of the issues that have led to additional, more complex challenges to maintaining work zone safety and mobility in Montana. Other issues that add to the complexity are an aging population and travelers with mobility and other impairments. To help address these issues, the Rule provides a decision-making framework that facilitates comprehensive consideration of the broader safety and mobility impacts of work zones across project development stages, and the adoption of additional strategies that help manage these impacts during project implementation. The Rule requires agencies to develop an agency-level work zone safety and mobility policy to support systematic consideration and management of work zone impacts across all stages of project development. Based on the policy, MDT has developed procedures and guidelines to support implementation of the policy, including project-level procedures to address the work zone impacts of individual projects.

A task force was set up within MDT to review the updated rule and develop a policy and guidance for implementation. Team members were:

Core team:

Mark Baum	Construction Traffic Control Engineer
Paul Jagoda	Construction Engineering Services Engineer
Justun Juelfs	Winter & Roadside Maintenance Specialist
Pierre Jomini	Safety Management Engineer
Lesly Tribelhorn	Highways Design Engineer
Bill Fogarty	Butte District Construction Reviewer
Lloyd Rue	Safety, Traffic, Design Engineer (FHWA)
Jim Skinner	Manager, Program & Policy Analysis

Oversight/
Review team:

Paul Ferry	Highways Engineer
Duane Williams	Traffic and Safety Engineer
Lisa Durbin	Construction Administration Services Engineer
Dan Smith	Specification Engineer
Kevin Christensen	Construction Engineer
Stefan Streeter	Billings District Construction Engineer
Doug Wilmot	Great Falls District Construction Engineer
James Combs	Great Falls District Traffic Engineer
Jeff Patten	Operations Engineer – Butte (FHWA)

GOALS AND OBJECTIVES

Goal 1: Reduce the number and severity of crashes, injuries and deaths in construction zones.

Objectives:

- Design a safe environment for the traveling public and workers
- Build and maintain a safe environment for the traveling public and workers
- Assess work zone crash trends and follow up for future project improvements
- Assess current practices and procedures and adjust as necessary
- Review and evaluate construction zone fatalities
- Assess crash management strategies for construction projects within identified high crash corridors

Performance Indicators:

- Number of construction zone traffic crashes
- Field evaluations of construction zone fatal crashes completed
- Number of traffic fatalities and injuries in construction zones
- Relative change in crash and severity rates during construction for selected significant projects

Goal 2: Improve on our current management practices of construction and maintenance operation road user impacts

Objectives:

- Minimize delays
- Maximize efficiency of Maintenance and Construction operations while minimizing hazards to road users and workers
- Coordinate with other projects and special events
- Develop an incident management plan when and where appropriate
- Manage queue lengths appropriate for location and project conditions

Performance Indicators:

- Travel time delay goals set for significant projects and corridor construction
- No queue impacts beyond defined limits
- Public comments

Goal 3: Assure appropriate level of knowledge, skills, and abilities for responsible parties to manage and evaluate construction zone safety and mobility.

Objectives:

- Develop, implement, and sustain a comprehensive work zone training program

Performance Indicators:

- Attainment of training milestones and goals (listed in Appendix C)

Goal 4: Minimize stakeholder impacts**Objectives:**

- Ensure early public involvement for significant projects
- Review design and construction options as early as possible in project development to minimize impacts to businesses and access requirements
- Keep stakeholders informed during project development and construction
- Minimize impacts to the immediate environment (such as noise, dust control, pedestrian and bicycle accommodation, wetlands, etc.)
- Public information and law enforcement elements are tailored to the project needs
- Assess selected significant projects with project advisory committee after substantial project completion

Performance Indicators:

- Public comments
- Project advisory committee feedback
- Responses to MDT public opinion surveys

Goal 5: Optimize construction zone traffic control design and implementation**Objectives:**

- Manage fiscal impacts of transportation management plan components
- Design and implement uniform construction zone traffic control
- Ensure statewide compliance with plans and specifications
- Develop transportation management plans
- Deploy practices and technologies that provide consistent and predictable speeds in the construction zone to minimize vehicular maneuvers.
- Establish detour and crossover speeds during design stage and use those speeds during construction
- Incorporate work zone safety and mobility requirements in impact assessment process for privately-funded work

- Inform other agencies about work zone safety and mobility
- Integration of STEP enforcement with district-wide enforcement agreements

Performance Indicators:

- Contract expenditures for work zone transportation management plan (TMP) components
- Speed-related construction zone crash characteristics
- Level of uniformity as determined by plan package and field reviews
- Traffic control change orders assessed
- Method of measurement and payment of traffic control evaluated

DEFINITIONS

Construction Zone

An area on a public highway or on the adjacent right-of-way where construction, repair, maintenance, or survey work is being performed by MDT, a local authority, a utility company, or a private contractor under contract with MDT or a local authority. A construction zone may include a work zone. The use of the phrase “construction zone” in Montana is analogous to “work zone” in the Rule. Construction zone is a broader term than work zone since a work zone is defined in Montana statute as an activity area within the construction zone.

Project Advisory Committee

Project-specific group that reviews and manages the project impacts on the stakeholders. Suggested committee members include the Project Design Manager, District Engineering Services Engineer, Engineering Project Manager, FHWA representative, District Construction Engineer, a public information representative (either MDT or consultant for construction project), and possibly a Chamber of Commerce or other local representative.

Public Information Plan

The Public Information (PI) component of the TMP includes communication strategies that seek to inform affected road users, the general public, area residences and businesses, and appropriate public entities about the project, the expected construction zone impacts, and the changing conditions on the project.

Significant Project

In general terms, a significant project is one that alone or in combination with other concurrent projects nearby is anticipated to cause sustained construction zone impacts greater than what is considered tolerable based on MDT guidelines and engineering judgment.

Specific criteria for determining the level of construction zone impacts for projects in Montana are listed in Appendix A of this policy.

Stakeholders

People who are affected by the construction project, including business owners, road users, government officials, regulators, tribal officials, etc.

Traffic Control Plan (TCP)

The Traffic Control Plan is considered equivalent to Temporary Traffic Control Plan (TTC).

A TCP describes measures within the contract (plans, specifications, etc) to facilitate road users through a construction zone, work zone or an incident area. The TCP addresses traffic safety and control through the construction and work

zone, and generally incorporates the specifications and details to control the operations within the construction zone.

Transportation Management Plan (TMP)

A TMP is comprised of strategies to manage project construction zone impacts. These strategies consist of a TCP. For significant projects, it also includes a Public Information (PI) plan and Transportation Operations (TO) plan. For all other projects, the TMP must consist of at least a TCP plan and may include TO and PI strategies as well.

A TCP describes measures to be used for facilitating road users through a work zone or an incident area. A TCP plan addresses traffic safety and control through the construction zone. The TO component addresses sustained operations and management of the construction zone impact area, and the PI component addresses communication with the public and concerned stakeholders.

Transportation Operations Plan

The Transportation Operations (TO) plan includes the identification of strategies used to mitigate impacts of the construction zone on the operation and management of the transportation system within the construction zone impact area. The construction zone impact area can extend to an area well beyond the immediate project area, and should cover such items as traffic signal timing on detour routes, signing requirements for detour routes, and road/intersection capacity issues created by detouring traffic.

Traveling Public

Users of the public transportation infrastructure, including highways, bridges, sidewalks, etc., for means of getting from one place to another. Traveling public refers to all users, and includes private and public cars, buses, trucks, bicyclists, and pedestrians.

Work Zone

The area where the construction, repair, maintenance, or survey work is actually taking place. The boundaries of the work zone must be clearly identified by the posting of signs.

Work Zone Mobility

In general terms, work zone mobility is the ability to move the traveling public efficiently through and around a work zone area with minimum delay compared to a baseline travel when no work zone is present.

Work Zone Safety

Safety refers to minimizing hazards to the traveling public and highway workers in a work zone.

PROCEDURES

Department Level Processes and Procedures

Managing Impacts

MDT will manage construction zone impacts by using various management strategies. Many of the strategies are listed in these guidelines, and were taken from FHWA's publication titled "Implementing the Rule on Work Zone Safety and Mobility" (pages 6-12 and 6-13).

Training Plan

Preconstruction, Construction, and Maintenance will evaluate their training plans regularly with their training coordinator to ensure employees are adequately trained in Work Zone Safety and Mobility. MDT personnel will be trained in temporary traffic control design, deployment, operation, and maintenance commensurate with their level of responsibility. Training may be either MDT provided courses or outside sources. MDT currently provides training on flagging, basic and advanced design, setup, maintenance, management and evaluation of construction zones. Potential training courses are listed in Appendix C.

Law enforcement, other governmental entities, and permittees (for utility and other maintenance work in the right-of-way) may obtain temporary traffic control training through local and national training providers, or through MDT sponsored training when approved by the training coordinator.

Process Reviews

1. Perform an annual assessment. Perform a process review at least every two years. The annual assessment determines the process review topic.
2. Evaluate construction zone data at the MDT level, or review randomly selected projects across jurisdictions. A combination of these approaches can also be used.
3. Include the appropriate personnel who will participate in the project development stages and the different functional areas within MDT, as well as the FHWA, to participate in the process review and annual assessment.
4. Encourage the participation of other non-MDT stakeholders, particularly Law Enforcement, in the process review and annual assessment, as appropriate.
5. The process review results are intended to lead to improvements in MDT construction zone processes and procedures, data and information resources, and training programs that ultimately enhance safety and mobility on current and future projects.

Project-Level Provisions

Nomination and Planning Stage

- Identify significant projects
- Identify potential corridor and regional impacts
- Assess budget and schedule implications

Design Stage

- Identify/confirm significant projects
- Develop TMP appropriate to project level
- Include TMP provisions in Plans, Specifications and Estimate (PS&E)
- Review and revise as necessary schedule and project cost estimates

Construction Stage

- Implement TMP
- Manage TMP
- Collect performance data
- Post-project assessment

Maintenance Work

- Implement TMP
- Manage TMP
- Collect performance data
- Post-project assessment

GUIDELINES

MDT Level Processes and Procedures

Managing Impacts

The best management practice is to minimize or reduce impacts before they occur. For MDT highway construction and maintenance projects, the tables in Appendix H (taken from the FHWA publication, "Implementing the Rule on Work Zone Safety and Mobility") can help determine the appropriate strategies to manage construction zone impacts most effectively. Some of the strategies will be applied at the planning or design stage to minimize or eliminate impacts, maximize project efficiency, and possibly reduce overall costs. Other strategies will be applied during project construction:

1. Project Level

Prior to the start of construction, the Engineering Project Manager (EPM) assesses the contractor-developed traffic control plans and sequences and compares them to the TMP components included in the plan package. Approval of the contractor's plans is contingent upon the balancing of safety, mobility, construction efficiency, and stakeholder impacts and needs.

During construction, the project traffic control inspector is to observe traffic traveling through the construction zone to determine if the construction zone devices are providing for the safety and mobility of the traveling public, for both day and night. The frequency of observation is guided by the significance level of the project or the observed performance of the traffic control plan in meeting the MDT's safety and mobility objectives. Should the inspector note locations where safety and mobility might be improved, the inspector is to inform the EPM of the location and provide a recommended action.

The EPM will consider the recommendation and implement those actions that are practical given the circumstances.

Law enforcement officers traveling through or patrolling the construction zone who observe an opportunity to improve the safety and mobility of the construction zone should contact the EPM to arrange a joint review of the construction zone. Alternatively law enforcement should leave a message for the EPM explaining what was observed for possible action.

When an incident or crash occurs within the construction zone, the EPM will collect, to the extent practical, information related to the event. The information will be reviewed to determine if changes can be reasonably made to reduce the potential for future incidents or crashes.

2. Headquarters Level

The Construction Engineering Services Bureau will review information and analysis available on construction zone incidents and crashes. The review will

provide a basis for recommendations to revise contract requirements and improve construction zone safety and mobility.

Training Plan

Estimated schedules for training on the various aspects of construction zone safety and mobility follow. Training topics appropriate to MDT functions are listed below. Individual areas will be responsible to review and update their training plans regularly to ensure compliance with MDT policy. Potential training courses are listed in Appendix C.

1. Planning and Design:
 - Overview of Rule on Work Zone Safety and Mobility
 - Introduction to MDT Policy on Work Zone Safety & Mobility
 - Implementation of MDT Policy on Work Zone Safety & Mobility
 - Traffic Control/TMP Design Training
 - Follow-up training and additional course offerings as needed
2. Construction:
 - Overview of Rule on Work Zone Safety and Mobility
 - Introduction to MDT Policy on Work Zone Safety & Mobility
 - Implementation of MDT Policy on Work Zone Safety & Mobility
 - Traffic Control Supervisor and Inspector Training
 - Additional training courses as necessary
3. Maintenance:
 - Overview of Rule on Work Zone Safety and Mobility
 - Introduction to MDT Policy on Work Zone Safety & Mobility
 - Implementation of MDT Policy on Work Zone Safety & Mobility
 - Traffic Control Supervisor and Inspector Training
 - Additional training courses as necessary
4. Outside agencies:
 - Make outside agencies aware of the rule on Work Zone Safety and Mobility and Local Technical Assistance Program (LTAP) course availability

Process Reviews

Periodic evaluation of construction zone policies, processes and procedures will help assess the effectiveness of the program and enable improvements to be made. Process reviews will be conducted in accordance with Appendix B, "Process Reviews."

Construction Zone Data

MDT staff will use work zone data as follows:

- At the process-level, analyze construction zone crash and operational data from multiple projects to improve MDT processes and procedures, and in-turn, pursue the improvement of overall construction zone safety and mobility.

- At the project-level, use field observations, available construction zone crash data, and operational information to manage the construction zone impacts of individual projects while the projects are under construction.
- Maintain elements of the data and information resources that are necessary to support the use of construction zone data for the above two activities.

Construction zone crash data are necessary to make an informed assessment of the success of efforts to manage construction zones and their impacts. Available data and information provide the basis for assessing performance and taking appropriate actions to improve performance on individual projects as well as overall processes and procedures.

MDT will set up procedures to collect traffic delay data and traffic volume data in construction zones for significant projects. MDT staff and FHWA will analyze the data in relation to design projected delays and to established objectives.

Construction Zone Data use and analysis are described in Appendix G.

Project-Level Provisions

Planning Stage

1. Identify significant projects

Identify significant projects and assign appropriate costs (PE, CE, CN) as early as possible in project planning. District or Preconstruction Bureau staff responsible for project nominations should identify significant projects and associated costs at nomination time.

Staff will use the "Significant Project" checklist, definition and tables (Appendix A) to determine level of significance. Significant projects will be identified in MDT's Program and Project Management System (PPMS) on the project Header and Nominations page.

Identify stakeholders that can help define strategies to develop and manage the TMP. Also identify the level of incident management needed. Suggested stakeholders would include:

- Law enforcement officials
- Emergency response teams
- Local government officials

Include additional costs associated with the TMP in the nomination. Developing and enforcing the TMP may add to Preliminary Engineering (PE), Construction Engineering (CE), and Construction (CN) costs. On the other hand, some strategies may be implemented during project design that could result in lower overall project costs.

2. Identify potential corridor and regional impacts

Project nominators and District staff will look for potential corridor or regional impacts of the proposed project. Rail, Transit, and Planning staff can be enlisted to help identify corridors that may warrant special consideration. Construction projects can impact adjacent corridors and regions as well as the corridor in which the project is located. Some areas to consider:

- High-Crash Corridors (as listed in the Montana Comprehensive Highway Safety Plan)
- Corridors with active or proposed environmental or traffic studies
- Congestion management areas
- Safety management areas
- Regional or corridor-specific growth issues
- Local government or regional planning studies
- Project timing with respect to adjacent projects listed in the Statewide Transportation Improvement Plan (STIP)
- Impacts on critical highways, streets, and intersections nearby
- Impacts on business and residents

Design Stage

1. Identify/confirm significant projects

Project Design Manager and design team will discuss project construction zone safety and mobility level of significance during the preliminary field review (PFR). The level of significance will be documented in the PFR report. Use the "Significant Project" definition and tables (Appendix A), known site conditions, anticipated construction methods, projected traffic conditions, local official's knowledge, and engineering judgment to make the determination. Discuss traffic control issues and detour potentials. Discuss impacts on stakeholders and traveling public. Think about wide load restrictions, detour accommodation of wide loads and possible adjacent projects, other advisories, significant community events and other special events.

For significant projects, create a TMP team. Suggested team members include:

- Project Design Manager
- Road plans designer (or consultant designer)
- Construction Traffic Control Engineer
- District Construction Engineer, Operations Engineer, or Engineering Project Manager
- District Engineering Services Engineer, Projects Engineer, or Traffic Engineer
- Traffic Project Engineer if necessary for capacity issues, safety accommodations such as traffic signals, or signing issues
- FHWA Operations Engineer or Safety/Traffic Design Engineer
- City official for urban projects

The TMP team will work together to determine the appropriate strategies to minimize construction zone impacts and develop the components for the TMP.

2. Develop TMP's appropriate to project level

The Project Design Manager (PDM) will be responsible for making sure the TMP is developed along with the project plan package. Include costs for the TMP components in the project cost estimate (CN and CE) and reassess the TMP at each design stage. See Appendix D for additional guidance on TMP's.

Alignment and Grade review should include discussions about traffic control, sequencing operations, constructability issues. Discuss wide load restrictions and possible adjacent projects, as well as impacts on stakeholders and traveling public. Alignment and/or grades are adjusted as necessary to accommodate critical issues. If possible at this stage, recognize peak directional traffic. Run models if necessary (i.e., Quickzone) to determine the number of lanes needed to accommodate acceptable level of service during construction.

The TMP team will meet at Alignment and Grade time to determine the level of TCP needed and identify applicable strategies to manage the impacts of the construction zone. As the road plans develop, the team will meet again to develop the traffic control plans, details, and special provisions. The road plans designer will draft the plans and details and include the special provisions in the plan package. Include the TCP in the Plan-in-Hand package for discussion and refinement. Note that the level of detail for the TCP will vary depending on the complexity of a project. Pavement preservation projects, spot improvement projects, and bridge replacements will often include detailed TCP's because the sequencing of construction operations is well defined and not subject to differing contractor operations. In contrast, large reconstruction projects with major grading operations depend on the successful contractor's fleet size and types of equipment, the locations of material sources, etc. Attention should be placed on producing special provisions that manage the critical aspects of the operations. The TMP team should focus on the traffic management at specific stages:

- Specific treatments for addressing roadside hazards
- Sequencing activities for realistic and efficient construction schedules
- Delineation during different stages of construction
- Hauling and roadway crossing operations
- Temporary advisory, regulatory, and warning signs
- Needs for requesting project level law enforcement
- Pedestrian, bicycle, and ADA accommodations
- Traffic control and construction limitations during community events
- Acceptable Level of Service (LOS), travel time delay goals and the acceptable queue lengths

Public involvement meetings include solicitations from the public of all issues they perceive with the project. Include an explanation of what MDT thinks the traffic control and detours will include, and ask for feedback. Remember to talk

about the temporary construction impacts of noise, dust, pedestrian and bike accommodations. Discuss the impacts of the proposed project and adjacent projects.

The Scope of Work report will document traffic control, sequencing, and detour proposals. Feedback from public involvement meetings and information gathered as a result of the environmental studies should be included in the report. If available, include information regarding projected construction impacts on level of service. Document the need for and anticipated components of the Traffic Operations (TO) and Public Information (PI) Plans. Appendix E has more guidance on PI plans and Appendix F further details the TO.

Plan-in-Hand review meetings include discussions on traffic control, sequencing, and detours, as well as constructability. Special provisions should be in the review plan set and be open for discussion. Wide load restrictions and impacts related to traffic control issues on adjacent projects should be discussed. Identify the locations for detour signing and other advisories. Include Special Provisions that specify the number of lanes to be maintained during peak hours. Define the peak hours and associated hourly volumes. If not done earlier in the design, recognize peak directional traffic. Run models if necessary (such as Quickzone) to determine the number of lanes needed to accommodate acceptable level of service during construction. Specify nighttime work requirements as necessary. Discuss and refine the TCP, TO, and PI.

For significant projects or projects within a High-Crash Corridor that entail significant detour work or major projected traffic diversion routes, the PDM will request a safety review update for the detour route(s) and/or diversion route(s). The Safety Management Section will provide the safety review with crash trend information. The PDM will analyze the safety review and the traffic volumes. PDM will coordinate with the TMP team for special traffic control on detours that may exhibit anticipated capacity or safety problems under construction traffic conditions. They will also look at critical intersections and interchanges (on- or off-site), where additional temporary traffic control may be justified. For projects, detours, or diversion routes at or near railroad tracks or at-grade highway railroad crossings, the PDM will coordinate design with the Railroad through the Utilities Section.

3. Include TMP provisions in PS&E

Final plan review provides an opportunity for District, Construction, Maintenance, FHWA, and Preconstruction personnel to look at the plan package before it goes to Contract Plans. Focus on construction zone issues, conditions that could aggravate safety or crash concerns, traffic control, and sequencing issues. Adjacent projects can be identified and the effect of cumulative traffic issues can be assessed for adequate construction measures.

The final plan review should answer the following questions:

- Are the Special Provisions adequate?
- Is adequate signing provided?
- Is the appropriate traffic control included?
- Is a public involvement plan included if necessary?
- Does project description include specific or unusual safety characteristics that were considered in the TMP design?

Construction Stage

1. Headquarters Staff

- Provide support to district and project level staff in understanding construction zone policies and guidelines, identifying and communicating issues related to the condition, design and usage of temporary traffic control devices, as well as the set up, maintenance, general appearance and functionality of construction zones.
- Perform quality assurance inspections of construction zones on a routine basis to promote consistency and compliance with policies and guidelines.
- Provide district staff with input on construction zone design modifications and operations.
- Ensure construction and work zone speed limits are appropriate in active and inactive construction zones.

2. District Office Staff

- Ensure field staff is implementing MDT policies and guidelines established in this policy.
- Ensure project staff has attended training appropriate to the level for the job decisions each individual is required to make.
- Ensure there is a trained person at the project level who has the primary responsibility and sufficient authority to provide for the safety and mobility of the construction zone.
- Ensure field project construction zone inspections are being conducted.
- Provide field project staff with input on contractor proposed modifications to construction zone design and operation.
- Perform quality assurance inspections of construction zones to promote consistency and compliance with policies and guidelines.
- Ensure construction zone speed limits are appropriate in active and inactive construction zones.
- Determine whether or not project-specific law enforcement is needed.

3. Construction Project Staff

- For projects with potential for traffic delays, conduct a pre-construction timing of travel through the project.
- Conduct day and nighttime construction zone reviews to assure the construction zones are maintained in a neat, orderly and effective manner for the safety and mobility of highway workers and the traveling public.

- Collect construction zone data at the project level and provide to headquarters for statewide analysis.
- Monitor, and make adjustments to construction zone traffic control, as necessary, to improve worker and the traveling public's safety, with the least possible delay to the public. Discuss changes with design or other staff as appropriate.
- Compare travel times through construction to pre-construction travel time if there are a relatively high number of public complaints related to delays.
- When needed, enact project-specific law enforcement agreements.
- Obtain copies of documentation from law enforcement on construction zone incidents for future assessment of construction zone impacts and development of corrective measures.
- Evaluate contractor's proposed traffic control plans

4. Contractor

- Designate a person trained appropriately to their level of duties at the project level who has the primary responsibility, with sufficient authority, for implementing the TMP and other safety and mobility aspects of the project.
- Ensure all contractor personnel are trained in traffic control to a level commensurate with their responsibilities.
- Ensure construction zones are neat, orderly and effective for the safety of highway workers and motorists.
- Minimize delay and disruption experienced during construction.
- Perform quality control review of construction zones to promote consistency and ensure compliance with contract documents, policies and guidelines.
- Recommend traffic control improvements to the EPM to address field conditions pertaining to traffic flow, visibility and worker and motorist safety.

5. MDT/Law Enforcement Liaison

- Request active and ad-hoc enforcement of law, as requested and needed, to promote safety and mobility in the construction zone.
- Impart basic knowledge of construction zone components and operations and trained in traffic control to a level commensurate with their responsibilities.
- Ask law enforcement officers to help identify construction zone concerns and report back to the EPM.
- Request law enforcement officers to take appropriate measures to clear construction zone incidents as quickly as possible.

Maintenance Work

The Maintenance Division or District Traffic Engineer will review and approve the Transportation Management Plan, typically consisting of a traffic control plan, to ensure that they are in compliance with the MUTCD and MDT's current detailed drawings.

Monitoring for compliance will be administered by a person or persons having the primary responsibility, with sufficient authority for reviewing the TMP and other safety and mobility aspects of the project. This individual and their authority will be identified during the pre-construction meeting.

Municipalities, Townships, Counties and Other Non-MDT Agencies or Corporations with Projects Utilizing Federal Funds

The Federal Register/Volume 69, No. 170, Section 630.1000, Subpart J - Work Zone Safety and Mobility requires that each entity with projects utilizing federal funds meet the new requirements regarding work zones by October 12, 2007. That subpart establishes requirements and provides guidance for systematically addressing the safety and mobility impacts of work zones, and developing strategies to help manage these impacts on all Federal-aid highway projects. Non-compliance with these requirements after October 12, 2007, may result in losing federal aid on existing projects and being ineligible for federal aid on highway projects after that date.

Municipalities, townships, counties and other non-MDT agencies or corporations with projects using Federal Funds in Montana are encouraged to follow MDT policy and guidance on work zone safety and mobility.

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APPENDIX A - Criteria for Defining Significant Projects

Significant Projects

A significant project is one that alone or in combination with other concurrent projects nearby is anticipated to cause sustained construction zone impacts greater than what is considered acceptable based on MDT guidelines and engineering judgment. Levels of impact are defined below. Projects with Level 1 impacts are considered significant.

The intent of the Work Zone Safety and Mobility Policy is to maintain flexibility for the project design team to determine project-specific impact levels. If project- or site-specific conditions indicate that a project could have a higher or lower level of significance, the design team is expected to develop the appropriate components of the TMP.

Impact Levels

Level 1

Work impacts the traveling public at the metropolitan, regional, or interstate level. The construction project has a high level of public interest. Construction work will directly impact a large number of travelers. Construction will have high user cost impacts and the duration is usually very long. Examples of this work type would be: major corridor reconstruction, high impact interchange improvements, full closures on high volume facilities, major bridge repair, repaving projects that require lane closures for more than three days and result in significant increases in congestion, etc.

Attachment 1 is a listing of the corridors in Montana that are of Level 1 significance. The following guidance defines the criteria used to decide if a project is Level 1:

1. Projects on non-Interstate principal arterials within urban areas that reduce the number of through travel lanes under any of the following conditions:
 - more than 3-consecutive days,
 - during the morning, lunch time or evening peak period, or
 - impair critical movements at a major intersection for more than a 3-consecutive day period.

An Urban area is defined as any land area within the boundaries of the designated urban areas (population over 5,000) as shown on the official urban-area maps.

2. Rural highway corridors that qualify for Level 1 significant projects are listed in Attachment 1.
3. Projects that meet other conditions as described on Attachment 3, Significant Project Checklist.

Other projects can be elevated to level 1 with a request through the District Administrator if contributing factors justify. Conversely, some projects do not have high levels of construction zone impacts and the Project Design Manager, with concurrence from the District Administrator, may apply for an exception to the Significant Project procedures that shall be documented and approved by the Preconstruction Engineer.

The TMP for Level 1 projects will consist of a Traffic Control Plan (TCP) as well as Transportation Operations (TO) and Public Information (PI) components. The TCP addresses traffic safety and control through the construction zone. The TO component addresses sustained operations and management of the construction zone impact area, and the PI component addresses communication with the public and concerned stakeholders.

Recent MDT projects that would exemplify Level 1, Significant Projects would include:

- The Highway 93 corridor reconstruction projects (N-5) between Evaro and Polson, with Average Annual Daily Traffic (AADT) ranging from 6,600 to 15,000, carrying heavy tourist traffic as well as serving the residents. The projects are located in an environmentally sensitive area within the Flathead Indian Reservation, confined by topographic and environmentally sensitive features. Detour options were limited, the traffic volumes and potential for significant delay and queuing were high, and the public, tribal, and political involvement were well above average.
- The shoulder and median mill/fill project on Highway 12 (NH-8) in Helena that shut down lanes during peak hours and backed traffic up to the railroad overpass, delaying morning traffic into Helena for more than three consecutive days.
- 10th Avenue South reconstruction in Great Falls (NH-60), which shut down multiple blocks of a principal arterial with a high commercial density to reconstruct the concrete pavement and widen the road.
- King Avenue Interchange reconstruction work in Billings (U-1010) which included involvement with the railroad, traffic volumes in excess of 30,000 AADT on four lanes, lane closures for extended periods of time, and the potential for major impacts on other intersections beyond the construction zone resulting from detouring traffic.
- Weeksville – West: 3.8 mile reconstruction project on MT 200 (P-6) that involved grading operations, blasting adjacent to the railroad, and paving operations. Although this section of highway is not on the Level 1 list, the nature of the project required Level 1 consideration. Blasting operations had the potential to delay traffic for up to 2 hours, so variable message signs and other public notification were used to minimize the impact on travelers.

Level 2

Work impacts the traveling public at the city or regional level. It has a moderate level of public interest. It will directly impact a moderate level of travelers. It will have low to moderate user cost impacts, and can include lane closures for a moderate duration if not during peak hours. Examples of this work type would be: Repaving work on roadways on

the National Highway System (NHS) with moderate AADT, minor bridge repair, shoulder repair and construction, minor interchange repairs, etc.

Attachment 2 is a listing of the corridors in Montana that are of Level 2 significance. The following guidance defines the criteria used to decide if a project is a non-significant, Level 2 project:

1. Projects on through roadways in any incorporated city/town.
2. Additional highway corridors that would qualify for Level 2 projects are listed in Attachment 2.

In addition, projects can be elevated to this level with a request through the District Administrator. Projects in high traffic areas or on secondary or off system routes may fall under level 2. Conversely, some projects do not have high levels of construction zone impacts and the Project Design Manager, with concurrence from the District Administrator, may apply for an exception to the Significant Project procedures that must be documented and approved by the Preconstruction Engineer.

For Level 2 Projects, the TMP may consist only of a TCP. Some of these Projects will require a limited TMP where the TCP and TO will be described briefly and where TCP and TO plans for critical phases may be developed. The level of public involvement will be assessed. Generally, a detailed and comprehensive PI component will not be necessary. However, public notification in newspapers and on the radio should be considered. See Appendix E for PI guidance and strategies.

Recent MDT projects that would exemplify Level 2 Projects would include:

- Milling and paving work on I-15 near Jefferson City that involved lane reduction without causing significant congestion,
- Reconstruction of US 287 (NH-8) to provide passing lanes and a wider roadway section that inconvenienced the traveling public, but didn't cause significant delay or congestion.
- Overlay projects east of Lincoln on MT 200 (NH-24) caused some inconvenience to the traveling public, but didn't involve significant delays.
- Nashua – East and West 10-mile reconstruction project on US 2 (NH-1) east of Glasgow that involved grading and structure work. Although this section of highway isn't on the Level 2 list, the proximity to Glasgow and the involvement with the Tribe elevated the project. Additional thought was given to traffic control to minimize the construction impacts to the traveling public.

Level 3

Work impacts the traveling public to a small degree. Public interest is low and AADT is low. Duration of work is short to moderate. Construction zones can be mobile, and typically this work is recurring. Examples of this work type would be: Certain low impact striping work, guardrail repair, minor shoulder repair, pothole patching, very minor joint sealing, minor bridge painting, sign repair, mowing, etc.

Typical, recent MDT work that would exemplify Level 3 Projects would include:

- Off system bridge reconstruction projects in rural areas with very low AADT, with single lane detours or road closures with alternative detour routes established.
- Routine Maintenance guardrail repair, mowing operations, striping, etc.
- Crack sealing projects where one short section of a through-lane may be closed for a day, then the operation moves on for the next day.

The TMP will consist of a TCP. TO and PI components are not necessary at this level.

Attachment 1.**LEVEL 1 CORRIDORS**

A. The following rural corridors:

<u>MDT Route*</u>	<u>Map Route</u>	<u>RP to RP</u>		<u>Description</u>
I-90	I-90	96	110	Missoula urban area – DeSmet to Bonner
I-90	I-90	297	331	Bozeman area - Belgrade to W. Livingston Interchange
I-90	I-90	434	457	Billings area – E. Laurel Int. to Pine Hills Interchange (Jct. I-94)
N-1	US 2	100	153	Marion to West Glacier
N-4	US 310	42	54	Rockvale to Laurel
N-5	US 93/MT 200	0	130	DeSmet (Jct. I-90) to Whitefish
P-6	MT 200	76	116	Plains – Ravalli
N-7	US 93	30	91	Darby to Missoula
N-50/P-50	US 191	20	91	Big Sky to Bozeman
N-85	MT 85	0	7	Four Corners to Belgrade

*Departmental route

B. Non-interstate principal arterials within the federally designated urban areas:

Anaconda	Bozeman	Havre	Laurel	Miles City
Belgrade	Butte	Helena	Lewistown	Missoula
Billings	Great Falls	Kalispell	Livingston	Whitefish

C. Projects on other corridors that are not listed may be considered significant; see the checklist (attachment 3) for additional guidance.

Attachment 2.**LEVEL 2 CORRIDORS**

A. All Interstate corridors and through-roads in incorporated towns not considered Level 1.

B. And the following corridors:

<u>MDT Route*</u>	<u>Map Route</u>	<u>RP to RP</u>		<u>Description</u>
N-1	US 2	0	100	Idaho border to Marion
N-1	US 2	153	280	West Glacier to Shelby
N-1	US 2	372	472	Havre to Malta
N-3	US 89	0	8	Vaughn to Sun River
N-5	US 93	130	187	Whitefish to Canada border
P-6	MT 200	0	76	Idaho border to Plains
N-7	US 93	0	30	Idaho border to Darby
N-8	US 12/US 287	0	108	Garrison to Three Forks
N-10	US 87	0	111	Great Falls to Havre
N-11	US 89	0	53	Gardiner to Livingston
N-12	US 20	0	9	Idaho border to West Yellowstone
P-13	US 287	48	65	Ennis to Norris
N-14	US 12/US 87	167	169	Roundup vicinity
N-16	US 87	0	48	Billings to Roundup
P-19	MT 1	0	17	Jct. I-90 to W. of Anaconda
N-20/P-20	MT 16/MT 200	0	64	Glendive to North Dakota border
N-24	MT 200	0	139	Bonner to Great Falls
P-28	US 212	45	72	Beartooth Highway
N-37	US 212	0	63	Crow Agency to Ashland
N-38	MT 40	0	4	Whitefish to Columbia Falls
P-49	MT 41	0	2	Dillon
N-50	US 191/US 287	0	20	West Yellowstone to Big Sky
N-52	MT 35	0	51	Polson to Kalispell
N-57	US 87/US 191/ MT 3/MT 200	0	83	Armington to Lewistown
N-60	US 87/US 89/ MT 3	71	96	Armington to Great Falls
P-78	MT 78	30	48	Absarokee to Columbus
P-82	MT 82	0	7	S. of Kalispell, Jct. US 93 to Jct. MT 83
P-84	MT 84	0	29	Norris to Four Corners
P-89	MT 41	0	3	Dillon
S-203	203	0	12	N. of Stevensville
S-205	205	15	27	Belgrade to Bozeman
S-206	206	0	10	Big Fork to Ferndale
S-269	269	0	6	Hamilton to Corvallis
S-269	269	15	21	Jct. 370 to Stevensville
S-411	411	0	3	N. of Belgrade
S-548	548	4	6.5	Jct. N-5 – East

*Departmental route

C. Some X-routes may qualify as Level 2 corridors; however, AADT counts are not available for most of these routes (but can be requested). In addition, small sections of Secondary routes that are not listed above may also qualify as Level 2. Consider traffic volumes, detour availability, and route confinement to determine whether or not the TMP should include a TO component.

Attachment 3.**SIGNIFICANT PROJECT CHECKLIST**

IF any of the following boxes are checked:

- ☐ Through-lane closures for more than 3 continuous days
- ☐ Through-lane closures during morning, lunch time or evening peak directional traffic flow periods for more than 3 continuous days
- ☐ Impair critical movements at a major intersection for more than a 3-consecutive day period

And one of the following:

- ☐ On Level 1 corridor list
- ☐ Principal arterial within an urban area

Or other triggers for significant projects apply:

- ☐ High level of public interest, political influences, or tribal involvement
- ☐ Critical movements at major intersections impaired for more than 3 continuous days (not necessarily within the construction zone).
- ☐ Impacts to adjacent roadways, intersections, or interchanges (outside the project limits) that increase delay by 15 or more minutes or will cause noticeable queues to form in new locations.
- ☐ In a confined setting with no room for detours (for example, a road corridor confined by a steep cut on one side and a river on the other)
- ☐ Major highway through an urban area with no alternate accesses for businesses
- ☐ Construction impacts are anticipated to be significant and justify all three TMP components
- ☐ Located within a High-Crash Corridor as described in the Montana Comprehensive Highway Safety Plan (Table VI-1 of CHSP)

THEN this project is considered a Significant Project for Work Zone Safety and Mobility purposes. The Traffic Management Plan (TMP) must include all three of the following:

- Traffic Control Plan (TCP)
- Transportation Operations (TO) component
- Public Information (PI) component

Note: Special considerations may be necessary for significant community events, but not for the rest of the construction period.

APPENDIX B – Process Review Guidelines

Process Reviews

Intent

Periodic evaluation of construction zone policies, processes, procedures, and construction zone impacts aids in the process of addressing and managing the safety and mobility impacts of construction zones. Reviews help assess the effectiveness of a program or a set of processes and procedures. They enable MDT and FHWA Division Office to make process or product improvements. Performance measures for the review will be documented and evaluated.

Scope

The review may be limited to specific procedures (e.g., review payment methods for traffic control devices) or may be broader in scope (e.g., review of overall performance measures of the construction zone safety and mobility goals and objectives).

Lead

Construction Traffic Control Engineer

Process Reviews may include the following actions:

- Assemble multi-disciplinary team.
- Develop review objectives.
- Determine review methods.
- Conduct review.
- Analyze and interpret results.
- Develop inferences, recommendations, and lessons learned.
- Prioritize recommendations and lessons learned.
- Develop implementation plan.
- Set performance objectives for next review.

Refine/Update the Policy and Guidelines

Use feedback from the different stages of program delivery to improve and refine the policy over time. Input and feedback may also be obtained from stakeholders, public and community outreach processes, contracting community, industry trade associations, law enforcement, and others.

Some considerations in refining or updating the policy include:

- Determining whether the policy and policy provisions serve the purpose of increasing safety, and minimizing the mobility impacts of construction zones;
- Determining whether the policy and policy provisions are relevant, practical, and easy to use for decision-making in real-world situations;
- Determining whether the goals, objectives, and performance requirements of MDT are being attained through the policy;

- Determining whether the policy and the policy provisions need to be updated or refined to reflect changing times, changing industry practices, or advances in technology;
- Capturing specific feedback from any of the program delivery areas that recommend refinement of the policy;
- Capturing specific feedback from non-MDT stakeholders, the public, business and community representatives, the contracting community, and industry trade associations or others that recommend refinement of the policy; and
- Analyzing policy implementation impacts on MDT resources.

The following are examples of questions that the process reviews may help answer:

- How are construction zones performing with respect to mobility and safety?
- Are the best possible decisions in planning, designing, and implementing our construction zones being made?
- Are customer expectations being met with respect to maintaining safety and mobility, minimizing business and community impacts?
- Can areas for improvement be identified?
- How have areas for improvement that were identified in the past been addressed?
- What has both worked and not worked – which strategies have proven to be either more or less effective in improving the safety and mobility of construction zones?
- What other strategies can be considered for implementation?
- Are there certain combinations of strategies that seem to work well?
- Can any construction zone safety and mobility trends be identified, at the national level or local level? What can be done to advocate characteristics associated with good trends? What can be done to remedy the problems associated with bad trends?
- How do construction zone performance, the effectiveness of strategies, or areas of improvement vary between day work and night work?
- Should policies or MDT procedures be adjusted based on what has been observed or measured?
- Can consistency be brought about in the identification of such trends, issues, and problems and in the standardization of tools and guidelines for application at the MDT, and/or national level?

APPENDIX C – Training Program

Training Program Planned Goals and Milestones

- All flaggers on MDT projects certified
- All of MDT roadway designers assigned to design or review TMP's for significant projects have successfully completed work zone designer training by October 2008
- All MDT roadway designers will have successfully completed work zone designer training by October 2010
- Consultants providing design services to MDT will be encouraged to attend work zone designer training on a voluntary basis
- Consultants providing design services to MDT will be required to adhere to MDT's Work Zone Safety and Mobility Policy by January 2008 for new contracts
- MDT training plan is delivered and updated for multi-disciplinary roles based on training assessments
- Local Agency Guidelines Manual includes work zone safety and mobility policy requirements, including the training requirements
- New Local Agency agreements include work zone safety and mobility requirements
- Make local agencies aware of training course availability through Local Technical Assistance Program (LTAP) and other sources
- By October 2009 all EPM's, District Traffic Engineers, and Maintenance Superintendents will have successfully completed Traffic Control Supervisor (or demonstrated equivalent) training

Potential Training Courses

1. Work Zone Traffic Control Design and Operations Courses (1 to 3-day classes)

Audience: Preconstruction and District design engineers and designers; District and Headquarters Construction personnel; Maintenance Chiefs and Superintendents

Course Objectives:

- Understand each step involved in providing work zone traffic controls.
- Identifying and applying workable concepts and techniques for designing; installing and maintaining controls in construction, maintenance, and utility operations.
- Identify the principles in the design of traffic control plans.
- Able to apply traffic control plans to site conditions, monitor traffic control and make changes indicated by traffic incidents and crashes.
- Understand the legal consequences related to work zone traffic control.
- Understand Montana related specifications and Detailed Drawings.

Current courses available: NHI course # 380003, 38003A; customized ATSSA Traffic Control Design Specialist courses.

Instructor: Contracted Instructor

Delivery Frequency: Annually at first, then biennial

2. Certified Work Zone Traffic Control Supervisor Courses

Audience: Engineering Project Managers (EPMs); lead construction technicians; Construction Reviewers; Maintenance Chiefs; Maintenance Superintendents

Course Objectives: Provide training on:

- Part 6, Manual on Uniform Traffic Control Devices (MUTCD).
- Identifying and applying concepts and techniques to design; installation and maintenance of work zone plans and devices in construction, maintenance, and utility operations.
- Principles of designing traffic control plans.
- Applying traffic control plans to short and long duration work zones, monitoring traffic control effectiveness, and making revisions indicated by traffic incidents.
- Understanding the legal consequences related to work zone traffic control.
- Montana related specifications and Detailed Drawings.

Current courses available: MLTAP Work Zone Supervisor Workshop, ATSSA Traffic Control Supervisor.

Instructor: Contracted Instructor

Delivery Frequency: Biennial with two offerings: one presentation west (Helena); one east (Billings)

3. Construction Zone Safety Inspection (1 & 1.5 day courses)

Audience: Permanent Construction and Maintenance employees with previous training and responsible for traffic control contract administration.

Course Objectives: Provide training on:

- Part 6, MUTCD principles and standards.
- Understand the importance of work zone safety devices.
- Identify the contract requirements for work zone devices.
- Inspection of the installation and operation of work zone safety devices, including discrepancies and deficiencies in safety devices.
- Resolving discrepancies from the contract requirements and ensuring correction of those discrepancies.
- Maintenance of traffic control devices.

Current courses available: NHI course # 380063; NHI course # 380063A; FHWA-NHI-134055; ATSSA Traffic Control Technician Course

Instructor: Contracted Instructor

Delivery Frequency: Biennial. Present one course west (Helena); one east (Billings)

4. Traffic Control Basics (1-day)

Audience: Field Construction and Maintenance technicians, Preconstruction and District designers and technicians with no previous training.

Course Objectives: Provide training on:

- Part 6, MUTCD.
- Traffic control design and layout.
- Modifying traffic control plans based on traffic incidents.
- MDT record keeping requirements.
- Montana related specifications and Detailed Drawings.

Current courses available: Not available at this time; to be developed later as needed.

Instructor: MDT Instructor

Delivery Frequency: Once annually, presented in the District offices as necessary.

5. Managing Traffic Incident and Roadway Emergencies. (1-day course)

Audience: Construction EPMs, mid-level technicians, and Maintenance technicians.

Course Objectives: Provide training on:

- Program elements needed for a multi-agency program to manage traffic incidents and roadway emergencies.
- Techniques for effective onsite management of incidents.
- Identify solutions to facilitate the management of incidents.
- Develop a short-term list of “next step” actions to improve multi-agency response to both major and minor traffic incidents.

Current courses available: NHI course #133048A. This course should be modified to include MDT specifications and record keeping.

Instructor: Contracted Instructor

Delivery Frequency: Biennial with two presentations: one course west (Helena); one east (Billings)

Additional Courses in Traffic Control

6. Possible CD or video self taught course for basic Traffic Control.
7. Flagger training for certification. (Maintenance, Core Drill, etc.) Scheduled by others; offered through the Local Technical Assistance Program (LTAP).
8. Establish an annual statewide traffic control field reviews by FHWA, Construction; Maintenance headquarters staff, and District Construction and Traffic Engineers.
9. Establish a “Train the Trainer” course for in-house taught courses.
10. Regional Construction Conference:
 - Specifications/Detailed Drawing updates.
 - Construction memos.
 - Update on NCHRP 350 changes.

Local Training Offerings

11. Work Zone Training (LTAP); by request
12. ATSSA Software: SW0941: Basic Traffic Control for Short Duration Activities: A modular course; available through LTAP
13. Montana Flagger Training (LTAP)

NHI Certification Option

NHI now offers Certificates of Accomplishment to support transportation professionals as they learn, build, and refine their skills in a variety of topic areas. Launched in October 2006, the Certificates of Accomplishment represent “suites” of complementary NHI courses, bundled together, that enable participants to enhance their depth and breadth of knowledge and expertise in specific disciplines.

Work Zone Safety

The NHI certificate of accomplishment in Work Zone Safety covers best practices to help practitioners design, operate, and maintain highway work zones that improve safety for workers and the driving public. The following courses make up the suite in Work Zone Safety:

- FHWA-NHI-380003—Design and Operation of Work Zone Traffic Control
- FHWA-NHI-380060—Work Zone Traffic Control for Maintenance Operations
- FHWA-NHI-380063—Construction Zone Safety Inspection
- FHWA-NHI-380072—Advanced Work Zone Management and Design

Proposed Course Calendar – Refer to course numbers above

2008	2009	2010	2011	2012
1. Two Offerings		1. Two Offerings		1. Two Offerings
2.		2.		2.
3.		3.		3.
	5.		5.	
10.	10.	10.	10.	10.

APPENDIX D – Transportation Management Plan (TMP) Guidance

For additional details see FHWA's manual titled "*Developing and Implementing Transportation Management Plans (TMPs) for Work Zones.*"

Developing TMPs for Projects

A TMP lays out a set of coordinated transportation management strategies and describes how they will be used to manage the construction zone impacts of a road project. The scope, content, and level of detail of a TMP may vary based on project impact level and the anticipated construction zone impacts of the project.

For **significant projects**, the TMP will consist of a Temporary Traffic Control plan (TCP) as well as transportation operations (TO) and public information (PI). A TCP addresses traffic safety and control through the construction zone. The TO component addresses sustained operations and management of the construction zone impact area, and the PI component addresses communication with the public and concerned stakeholders.

For projects that are **not classified as significant projects**, the TMP may consist only of a TCP. However, consider TO and PI strategies for these projects as well.

The TCP may be incorporated in the TMP by reference, such as reference to elements in the standard specifications, detailed drawings, plans or manuals. TCPs may also be specifically designed for individual projects.

Pay item provisions for implementing the TMP will be included in PS&Es, either through method-based (pay items, lump sum, or combination) or performance based specifications (performance criteria and standards).

MDT and the contractor shall each designate a trained person at the project level who has the primary responsibility and sufficient authority for implementing and managing the TMP.

Developing the TMP will involve identifying applicable strategies to manage the impacts of the construction zone. The costs for the management strategies need to be incorporated in early project estimates and the budgeting process to ensure that funding is available for TMP implementation.

TMP Development During Planning and Design

Two of the keys to a successful TMP are:

- Developing it as early as possible.
- Using a multidisciplinary approach.

Analyses during systems planning and preliminary engineering will help ensure adequate implementation costs are included in the project budget. At this early stage, more alternatives for addressing construction zone impacts are available, so a broader range of

strategies can be chosen. For example, at this stage one available strategy is scheduling and coordinating projects to minimize the cumulative impacts of multiple projects in a corridor or region. Another strategy available in the earlier stages of project development is to consider construction zone impacts in the evaluation and selection design alternatives. For some projects it may be possible to choose a design alternative that alleviates many construction zone impacts. See Appendix H for strategies to minimize construction zone impacts.

Step 1 – Compile Project Material

The project design team begins by compiling available project materials such as:

- Project definition (project scope, roadway and traffic characteristics, other factors such as public outreach, community information, etc.).
- Construction phasing/staging approaches and plans.
- Preliminary construction zone management strategies.
- Preliminary cost estimates for strategy implementation (when available).
- Information from other projects in the corridor to evaluate the combined or cumulative impact of the projects.

Step 2 – Determine TMP Needs

The elements of a TMP needed for a project are based on whether the project is determined to be significant. If a project is expected to be significant, the TMP will consist of a TCP as well as a TO component and a PI component. For projects that are not classified as significant projects, the TMP needs to contain a TCP. While TO and PI components are optional for non-significant projects, you are encouraged to consider including them.

Level 3 Projects – Basic TMP (TCP)

Basic TMPs are typically applied on construction or maintenance projects that have a minimal disruption to the traveling public and adjacent businesses and community. These projects typically only involve the development of a TCP (same as Temporary Traffic Control Plan).

Basic TMPs may consist of the combination of a sequencing special provision, plus a couple pages of TCP or referencing the detailed drawings.

Level 2 Projects – Intermediate TMP (TCP and some optional TO and/or PI)

Intermediate TMPs are likely to be used for construction or maintenance projects that are anticipated to have more than minimal disruption, but have not been identified as significant projects. Intermediate TMPs provide more detailed mitigation strategies. In addition to a TCP, intermediate TMPs would also include some element of public information (PI) and/or traffic operations (TO) strategies, as well as cost estimates.

Level 1 (Significant) Projects – Major TMP (TCP/TO/PI)

Major TMPs are intended for significant projects. Major TMPs consist of a TCP plan, and also address PI and TO components. In addition, TMPs may also contain cost estimates, coordination strategies between stakeholders, secondary mitigation

strategy(s), analysis of potential impacts on detour routes, and analysis of the potential impacts of the management strategies. The consideration and incorporation of these additional items may help MDT develop and implement a TMP that effectively manages the construction zone impacts of the project, and serves the needs of MDT, the traveling public, workers, and other parties affected by the project.

Step 3 – Identify Stakeholders

This step involves the identification of stakeholders that can provide valuable input to MDT on what strategies to include in the TMP to help manage the construction zone impacts of a project. This is generally intended for the development of intermediate and major TMPs. Stakeholders should represent different perspectives and will vary depending on the nature of the project. Stakeholders may include internal MDT staff from planning, design, safety, construction, maintenance, public affairs, public transportation, pavement, bridge, and other technical specialists; and external stakeholders such as local government (county, city, regional), FHWA, public transportation providers, contractors, railroad agencies/operators, freight operators, enforcement agencies, utility providers, emergency services, local businesses, community groups, and schools.

It is recommended that a TMP team be developed early in design for significant projects to see the project through from design to final assessment.

Step 4 – Develop TMP

The essence of the TMP development process lies in developing and evaluating the best combination of construction sequencing/staging, project design, TCP plan, TO strategies, and PI strategies, hand-in-hand with each other. Construction zone management strategies should be identified based on the project constraints, construction sequencing/staging plan, type of construction zone, and anticipated construction zone impacts. Cost is often a constraint for the development of a TMP, particularly for significant projects. Finally, the TMP needs to include appropriate pay item provisions for implementation.

For basic TMPs, the TMP development process will largely consist of developing a TCP. The TCP can be either a reference to specific traffic control elements in the approved standard specifications, detailed drawings, or can be designed specifically for the project.

Step 5 – Update/Revise TMP

This step represents the iterative aspect of TMP development. The TMP is a ‘dynamic document’ that is maintained and revised by the TMP team as the project progresses and when more information becomes available. This step may include the possible reclassification of a project as significant or not significant.

Step 6 – Finalize Construction Phasing/Staging and TMP

The plans, specifications, and estimates (PS&E) will include all the applicable elements of a TMP. It is encouraged to begin TMP development early in the project development process.

TMP Implementation, Monitoring, and Revisions during Construction**Step 7 – Re-evaluate/Revise TMP**

If alternative construction phasing/staging plans or other management strategies have been suggested, MDT needs to review the TMP to see if changes are needed. TMPs developed or revised during construction must be approved by MDT prior to implementation (i.e. by change order).

Step 8 – Implement TMP

The TMP is implemented. Some components of the TMP may need to be implemented prior to construction (e.g., public information campaign, improvements to detour routes).

Step 9 – TMP Monitoring

Monitoring the performance of the construction zone and that of the TMP during the construction phase is important to see if the predicted impacts closely resemble the actual conditions in the field and if the TMP is working effectively. Examples of possible performance measures for TMP monitoring include volume, travel time, queue length, delay, number of incidents, incident response and clearance times, contractor incidents, community complaints, user costs, and cumulative impacts from adjacent construction activities. Performance monitoring requirements and measures should be based on MDT policies, standards, and procedures, and should be included in the project contract documents when appropriate. TMP monitoring and assessment are best written into the TMP during TMP development, rather than devised after the fact.

Step 10 – Update/Revise TMP Based on Monitoring

If performance requirements are not met, MDT should revisit the TMP and consider alternate management strategies and/or sequencing/staging approach(es) that meet the approval of MDT.

TMP Performance Assessment**Step 11 – Post-Project TMP Evaluation**

Following construction completion, it is a good idea, particularly for significant projects, to prepare a short report that contains an evaluation of the TMP. Elements to consider including in the post-project evaluation are successes and failures, changes made to the TMP and results of those changes, any feedback received from the public, actual measures of conditions versus what was predicted, cost for implementation of the strategies, and suggested improvements. The findings can be used to help in the development and implementation of future TMPs. TMP performance assessment can aid in addressing the following concerns:

- Which management strategies have proven to be either more or less effective in improving the safety and mobility of construction zones?
- Are there combinations of strategies that seem to work well?
- Should TMP policies, processes, procedures, standards, and/or costs be adjusted based on what has been observed or measured?
- Are the best decisions in planning, designing, implementing, monitoring, and assessing construction zones being made?

APPENDIX E – Public Information (PI) Guidance

A construction zone public information and outreach campaign involves communicating with road users, the general public, area residents and businesses, and appropriate public entities about a road construction project and its implications for safety and mobility. Developing and implementing a public information and outreach campaign should be started well before road construction begins and will require ongoing monitoring throughout the life of the project.

For additional details and examples see FHWA’s manual titled “*Work Zone Public Information and Outreach Strategies*.”

Planning and implementing a public information and outreach campaign involves a set of key steps that will be coordinated and outlined in a public information and outreach plan (PI). Work with the MDT Public Information Officer (PIO) when developing the PI component of the TMP.

1. Determine the appropriate size and nature of the public information and outreach campaign

The size and nature of a public information and outreach effort will be determined by the characteristics of a project, its location, and the anticipated impacts of a road construction project. Aspects to consider include size and duration of the project, the amount of delay anticipated, special traffic and safety conditions such as heavy truck traffic, and disruptions to other modes and key facilities such as airports, stadiums, and hospitals. Also consider the impact on business accesses.

2. Identify resources

In most cases, public information and outreach spending will need to be part of a road construction project budget (PE, CE, CN).

3. Identify partners

Working with a range of partners to design and implement an information and outreach campaign will strengthen the strategies employed and may reduce the costs to MDT. Partners include, among others, State and local agencies, major employers, business and neighborhood associations.

4. Identify target audiences

A key to any communication strategy is to identify the target audience(s). This will help to determine the types of messages that need to be conveyed and the best ways of communicating those messages.

5. Develop the message(s)

In general, the messages communicated by the campaign should provide project information to maintain safety and minimize delay, and should indicate that MDT cares about the driving public. More specific messages might include details of the

construction zone, travel times through the construction zone, and alternate routes and modes of transportation.

6. Determine communication strategies

How information is communicated will depend on the audiences, the messages to be conveyed, and the campaign budget.

7. Determine communication timing

Public information and outreach should not be limited to when a construction zone is up and running. Before work commences is the best time to begin developing partnerships and informing the public about the project, its anticipated impacts, and how to find out more information. Post-construction it is a good idea to publicize completion and to thank project partners.

8. Evaluate campaign effectiveness

Evaluating the effectiveness of a public information and outreach campaign should be part of a long-term effort to improve safety and mobility in and around construction zones. During a long road construction project it is advisable to periodically evaluate the effectiveness of the public information and outreach campaign with the aim of redirecting resources if necessary.

Determine the Appropriate Size and Nature of the Campaign

The size and nature of a public information and outreach effort should ideally be determined by the anticipated impacts of the road construction project. Refer to Impact Levels in Appendix A. For a short-lived, small project causing minor traffic disruption, public information and outreach may be limited to routine publication of details in newsletters, web sites, and/or other traveler information outlet. For projects deemed significant, as described in Appendix A of this guidance, a more elaborate public information and outreach campaign will be warranted. However, most planned and unplanned (emergency) construction zones should incorporate some form of public information and outreach.

A range of elements should be considered when determining the size and nature of a public information and outreach campaign. These include the effects of the project on:

- Traffic delay and safety at both the corridor and network levels, including the effects on parallel corridors and alternate routes.
- Traffic delay and safety at nearby intersections, interchanges, and railroad crossings.
- Special traffic and safety conditions such as heavy truck traffic, steep grades, and poor weather.
- Disruptions of other modes of transportation including public transportation, airports, and pedestrian access.
- Evacuation routes.
- Hazardous material transportation routes.
- Emergency responders (hospitals, fire stations, military installations).
- Other public and private entities (such as schools and universities).

- Planned special events (sporting events, holiday parades, concerts, etc.).
- Businesses and residences.

If a construction zone is relatively small and of short duration, determining its effects may require nothing more than an informal consideration of these factors. In other cases, determining the effects of a construction zone and the needs of a public information and outreach campaign may require some significant data gathering and analysis. In some cases, information will be available from research conducted in the planning stages of the project.

For long-term projects, determining needs may be an ongoing process. Information collected formally (traffic delay data, public opinion surveys, etc.) and informally (community meetings, letters of complaint, etc.) can be helpful in identifying when the plan for the campaign may need to be adjusted to address changing conditions or varying degrees of effectiveness.

Identify Partners

In both the planning and implementation stages of a public information and outreach campaign the lead agency should consider working with a range of partners. Partners in the public information and outreach process may include: (1) State and local agencies (including city/county governments and emergency responders); (2) elected and appointed public officials; (3) construction zone personnel (e.g., construction contractors, traffic control providers, law enforcement); (4) major employers and service providers (e.g. hospitals) in the affected area; (5) other groups such as the local chamber of commerce; (6) traveler information providers, including radio, TV, newspapers, and AAA; and (7) planned special event coordinators.

Identify Your Target Audiences

A key to any public information and outreach campaign is to identify the target audience(s). This will help to determine the types of messages that need to be conveyed and the best methods of communicating those messages. Ultimately, the target audiences are travelers or potential travelers

Determine Communication Strategies

After identifying the appropriate audience and messages for the construction zone project the next step is to determine the strategies that will be used to get the messages to the target audiences. There is a wide range of ways to communicate with the public about construction zones. The strategies used must be tailored to the project context, the message being conveyed, and funding limitations.

The following list provides a number of communication strategies for disseminating construction zone messages:

- Project web site
- MDT construction traveler information website
- Direct mail
- Brochures/flyers/factsheets
- Newsletter
- Highway advisory radio
- Montana Travel Info Phone: 511
- Email alerts
- Radio advertising and public service announcements
- Public meetings/workshops/events
- Newspaper articles, advertising
- TV advertising and feature stories
- Variable message signs
- Personal contacts

Communication strategies can be modified to fit the needs of the project for which they are being used. A combination of several of strategies may make sense for some projects, while only one or two of the strategies may be necessary for other projects. Typically there will be a significant amount of interaction between different means of communication. For example, informational materials such as brochures and fact sheets are often posted to project web sites, thereby making them more widely accessible. Similarly, information posted to project web sites or gained from project materials may be used by news media to provide information through newspapers, the radio, and television news. Furthermore, drivers are likely to use a variety of different means of communication, meaning that messages must be consistent across all communication strategies. A driver who reads something in the newspaper stating that road closures will be occurring over the weekend could potentially refer to the project web site for further information. It is important that the information on the web site is consistent with what was in the newspaper, and also expands on that information by providing more details.

Determine When to Communicate

Providing information to the public should not be limited to when a construction zone is up and running. A public information and outreach campaign should also consider strategies to be implemented before construction begins and after the project is complete. In the before phase, the campaign should concentrate on general information about the project, the problems it may cause, and how to find out more information. This might involve a range of outreach and communication methods such as working groups/planning advisory groups, public workshops, a project web site, print media, and branding. Near the commencement date of a construction zone, it may be appropriate to add other methods such as free media coverage and paid advertising, and the use of variable message signs.

After the completion of the project, an agency can provide information about successes and failures of the project and thank project partners. This is a chance to enhance the image of MDT as a government agency with a customer-driven focus.

The project web site may also be used to publicize information about project completion. Some people may only occasionally travel the area and may be checking to see what is happening. An old web site, if not updated or removed, can become an ambiguous source

of information and cause confusion about whether or not the construction zone is still in place. If the web site is removed, it is recommended that agencies retain ownership of the web site domain name for a period of time following completion of the project in order to prevent others from purchasing the domain name and using it for undesirable means.

Evaluate Effectiveness

Evaluating the effectiveness of a public information and outreach campaign can help improve safety and mobility in and around construction zones. During a long road construction project it is advisable to periodically evaluate the effectiveness of the public information and outreach campaign with the aim of redirecting resources if necessary. An evaluation might include:

- Documenting and reporting the impacts of the construction zone, such as the number of crashes and traffic delay.
- Documenting and reporting the questions, comments, compliments, and complaints received via hotline, web site, letter, etc.
- Assessing perceptions of successes and failures among the project partners.
- Surveying the public, businesses, or commercial truck drivers affected by the construction zone.
- Surveying tourism bureaus or other major facilities near the construction zone, such as rest stops.

One of the best ways of evaluating the effectiveness of a public information and outreach campaign is through a statistically valid telephone survey. Items assessed may include the following:

- Awareness of the project and project information resources.
- Changes in travel behavior including trip timing, routes, travel modes, and destinations.
- Employers' provision of incentives such as flexible schedules, transit payments, company vanpools, etc.
- Travel problems encountered.
- Levels of traveler dissatisfaction.
- Methods of accessing construction zone information.
- Usefulness of the information.
- Knowledge of the reasons for the construction project.

Formal post-construction reviews (PCR's) and informal reviews should include an evaluation of the effectiveness of the PI plan. Documentation and follow-up on the lessons learned will improve the process for future projects.

Communication Strategies

Table E.1 provides guidance on when to use the various communication strategies:

Table E.1 - MDT Public Information and Outreach Strategies for Significant Projects

Strategy	Who	Primary Target Audience	Benefit	Issues	Implementation Phase	Relative Cost to Project
Website www.mdt.mt.gov	- Public Information Office/ Hired Public Information Coordinator	- Pre-trip travelers - Most other audiences	- Access to real-time information. - Ability to access all project related materials in one place. - May be easy to update	- Target audience must be aware of the web site. - May not reach all of the target audience (excludes people without an Internet connection. - Information must be current and active. - Cost will vary dependent on complexity of web site. - Site should be updated daily. - Information can become stale quickly. - Often targets local motorists only. - Must be designed in a manner that makes drivers want to read the information.	- Pre-construction - Construction - Post-Construction	Low/ Medium
Brochures / flyers Fact sheets / newsletters	- Public Information Office/ Hired Public Information Coordinator	- Local travelers - Commuters - Commercial drivers - Residents	- Low cost - Easy to distribute	- Information can become stale quickly. - Often targets local motorists only. - Must be designed in a manner that makes drivers want to read the information.	- Construction - Post-Construction	Low/ Medium
Public meetings/ task forces / workshops / events	- Designer (preconstruction) - District (during construction)	- Local travelers - Major trip generators - Residents - Businesses - Public officials - Major employers - Local agencies	- Good exposure to the public. - Give agency a chance to raise credibility with the public. - Gives public a chance to voice their concerns. - Chance to solicit information related to construction zones.	- Need to make sure the right audience is at the events. - Need to be wary of making “empty” promises. - Need to be cautious of comments solely from the vocal minority.	- Pre-construction -Construction	Low
Paid newspaper advertising	- Public Information Office/ Hired Public Information Coordinator	- Local travelers (pre-trip) - Commercial drivers (pre-trip) - Major trip generators - Residents and small businesses	- Can reach many people at one time. - The same ad can be used in many different newspapers. - Agency controls the content and timing of the message.	- May not target non-local motorists. - Newspaper readers may skip over ads. - Requires targeted audience to receive the paper.	- Pre-construction - Construction - Post-Construction	Medium/ High

Table E.1 - MDT Public Information and Outreach Strategies for Significant Projects

Strategy	Who	Primary Target Audience	Benefit	Issues	Implementation Phase	Relative Cost to Project
Paid TV advertising	- Public Information Office/ Hired Public Information Coordinator	- Pre-trip travelers - Local travelers	- Can reach many people at one time. - Agency controls the content and timing of the message.	- May not target local motorists. - Time of broadcast	- Pre-construction - Construction - Post-Construction	High
Radio advertising, public service announcements (PSA's)	- Public Information Office/ Hired Public Information Coordinator/ District	- Pre-trip travelers - Local travelers	- Can reach many people at one time. - Little or no cost. - Target people who are likely to use the information.	- May only target local motorists. - Coverage more likely for major projects. - Don't have as much control of the message	- Construction	Low
Project hotline / 511 Montana Travel Info	- Maintenance and Engineering Services	- Pre-trip travelers - Drivers en route	- Information can be accessed whenever it is needed. - Can allow motorists to provide feedback via recorded message. - May be easy to update.	- Information must be current. - Audience needs to be aware of the hotline number.	- Construction	Low/ Medium
Variable message signs (DMS)	- Districts/ Contractor	- Drivers en route	- Provides information directly to motorists affected by the project. - Can provide detour information.	- Message must be easy to read. - Signs must be placed appropriately. - Information should be useful and accurate.	- Construction	Low/ Medium/ High
Emergency and Information Booklet	- Districts	- Construction Staff - Contractors - Emergency Services	- Make information easily available. - Possible faster response time	- Requires contacts to be made by district personnel. - Information needs to accurate	- Construction	Low
Web-connected traffic cameras	- Public Information Office/ Hired Public Information Coordinator/IT/MES D	- Pre-trip travelers - Most other audiences	- Allows users to view real-time traffic conditions. - Users find information credible because they can actually see the traffic conditions on the road	- May exclude users with a dial-up connection. - Cameras can be costly. - MDT doesn't have experience with this method yet.	- Construction	Medium

APPENDIX F – Transportation Operations (TO) Guidance

The TMP team will review and consider the following Transportation Operations strategy areas to mitigate construction zone impacts.

Demand Management

Work with local transit services to attempt to:

- Modify routes or schedules to reduce traffic volumes through the construction zone.
- Consider fare reduction to improve ridership and reduce traffic volumes.
- Identify other alternatives that could reduce traffic volumes using mass transit, such as adding shuttle services.

Other transportation demand management strategies include:

- Park and ride, carpooling promotion.
- Working with large employers to temporarily enact variable work hours, changed work shifts, strategically timed vacations or shutdowns, and telecommuting.
- Encouraging the use of alternate routes.

Corridor/Network Management

Consider the following to improve traffic flow through the construction zone.

- Signal Timing/ coordination improvements.
- Temporary traffic signals.
- Street/intersection improvements.
- Turn restrictions.
- Truck/heavy vehicle restrictions.
- Dynamic lane closures.
- Ramp closures.
- Coordination with adjacent construction zones.

Construction Zone Safety Management

Items to consider are:

- Speed limit reduction/variable speed limits.
- Temporary traffic signals.
- Temporary traffic barrier.
- Crash cushions.
- Temporary rumble strips.
- Construction Safety supervisors and inspectors.
- Road Safety Audits.
- Windshield Surveys.

Traffic/Incident Management and Enforcement

Items to consider are:

- Traffic screens.

- Coordination with media.
- Local detour routes.
- Incident management plan.
- Dedicated or cooperative law enforcement.

APPENDIX G – Construction Zone Data Guidance

Use of Construction Zone Data

MDT staff can use work zone data as follows:

- At the project-level, use field observations, available construction zone crash data, and operational information to manage the construction zone impacts of individual projects while the projects are under construction.
- At the process-level, analyze construction zone crash and operational data from multiple projects to improve MDT processes and procedures, and pursue the improvement of overall construction zone safety and mobility.
- Maintain elements of the data and information resources that are necessary to support the use of construction zone data for the above two activities.

Construction zone crash data are necessary to make an informed assessment of the success of efforts to manage construction zones and their impacts. Available data and information provide the basis for assessing performance and taking appropriate actions to improve performance on individual projects as well as overall processes and procedures.

Using Construction Zone Data at the Project-Level

At the project-level, use the available construction zone crash data and operational information to manage construction zone impacts for specific projects during implementation. Construction personnel will use the data to evaluate whether or not mitigation strategies are needed to correct deficiencies or to improve safety and/or mobility.

Both real-time and archived data from such systems can be used to identify safety and mobility issues and trends and take appropriate action as necessary. Police crash reports are useful tools for evaluating construction zone practices.

Work Zone Crash Assistance Team Process

A “Construction Zone Crash Assistance Team” will be created to review fatalities in construction zones. The team will consist of the Engineering Project Manager, Construction Traffic Control Engineer and FHWA. (Others may be included as needed: District Construction Engineer, Preconstruction Engineer (or representative), Legal, District Traffic Engineer, and Bridge representative (if a structure is hit). The goals of the response team will be to provide support and assistance to the project crew, documentation of the crash, determine if there are any immediate improvements that may be done to the construction zone, follow-up on any “lessons learned” for future construction zones, draft a summary of findings for Legal, and a resource for possible Tort Claims. Note: For MDT Maintenance projects or utility relocations, the team will consist of other personnel as appropriate.

This team should be contacted immediately by the Engineering Project Manager or District Construction Engineer when there is a fatality on their project.

The team will discuss the situation to determine the needed corrective measures and documentation.

This team will meet at the site as soon as reasonably possible, if necessary, and:

- Review the situation.
- Determine if there are any “must fix” issues in the construction zone. Work with the EPM on this item.
- Review, evaluate, and compile a summary of findings with any recommendations to improve temporary traffic control. This document must be directed to Legal Services so that it is “attorney-client privileged”.
- Determine if there are any “lessons learned” that should be communicated statewide. These will not be covered by any privilege.

Notes:

1. Create a phone tree to call this team at all hours. Have a backup person for each team member.
2. EPM or designee should video tape the site and construction zone in both directions as soon as possible. Any video made should have no sound (muted).
3. Determine what type of training these team members may need, i.e. Technical Crash Investigation.
4. Create a help guide, for the project staff, on what to do when a fatality or crash happens. This would be a quick reference to assist them in this stressful situation.

Using Construction Zone Data at the Process-Level

At the process-level, MDT will continually pursue improvements of construction zone safety and mobility by analyzing construction zone crash and operational data from multiple projects to improve MDT processes and procedures. The same project-level data and information from multiple projects may be compiled and analyzed to identify trends and determine if there are common problems that could be remedied by a change in policy or practices. Construction zone crash data may be used to conduct post-construction evaluations, support process reviews, develop lessons learned, and ultimately improve MDT policies and procedures. This data and information typically becomes available during project implementation and needs to be retained and maintained for post construction analysis.

Traditional analysis of construction zone crashes before, during, and after construction projects can be useful in highlighting which types of projects, work activities, traffic situations, or traffic control schemes result in the least crash risk. But crash record systems generally do not contain information about specific projects and construction zone attributes. The value of such analysis is enhanced when crash reports offer greater detail, operational data allows the computation of crash rates, or means exist to link crashes to construction zone features or construction phases.

Developing new data and information resources or modifying existing resources to support the effective use and analysis of construction zone data will likely be an

evolutionary process that occurs over time. As the data are used more to assess and improve construction zone procedures and practices, MDT may find better ways to store and manage data, or identify additional data elements that would be useful to incorporate into data systems. Systems may also need to be adapted or expanded as more data and data sources become available. While maintaining data and information resources for construction zones will entail some effort, these resources greatly increase the ability to identify construction zone issues, detect patterns or trends associated with recurring issues, and determine potential improvements.

Crash Data Analysis

Every two years, the Safety Management Section will perform a statewide construction zone safety engineering analysis, based on the statewide crash records from the Montana Highway Patrol. Construction zone crash trends will be identified with pertinent details. Trend changes will be noted and recommendations for corrective actions or process improvements will be presented to the Work Zone Safety & Mobility Core Team. This team will help finalize the analysis and recommendations for future improvements to construction zones. Any implemented recommendations will be reviewed at the next engineering crash analysis to determine if improvements have been made.

Every year the Work Zone Safety & Mobility Core Team will assess the past construction zone crashes to see if any immediate corrective action can be implemented. This may be completed using confidential crash investigator's reports or other available information/data. The Traffic and Safety Bureau can assist with this review.

Future Goals for the Use of Crash Data

The goal for improved crash data in construction zones is to recognize MDT's needs and strive to improve all types of data. The information and details of the construction zone crash data should be considered during this project development stages and during the traffic records strategic plan implementation plan. MDT should continue to work with the enforcement agencies with timely data and any additional information that may be useful.

Mobility Data Collection and Analysis

MDT will set up procedures to collect traffic delay data and traffic volume data in construction zones for significant projects. MDT staff and FHWA will analyze the data in relation to design projected delays and to established objectives.

Following is a link to the NCHRP report on reducing construction zone crashes:

http://www.trb.org/publications/nchrp/nchrp_rpt_500v17.pdf

APPENDIX H – Strategies for Managing Construction zone Impacts

The following tables contain possible strategies that can be applied to projects during design or construction to minimize the impacts of construction zones.

TABLE H.1: Construction zone Management Strategies by Category, Part I

Temporary Traffic Control (TTC)		
Control Strategies	Traffic Control Devices *	Project Coordination, Contracting and Innovative Construction Strategies
<ul style="list-style-type: none"> • Construction phasing/ • Full roadway closures • Lane shifts or closures <ul style="list-style-type: none"> – Lane width reductions (constriction) – Lane closure – Reduced shoulder width – Shoulder closure – Lane shift to shoulder/median • One-lane, two-way operation • Two-way traffic on one side divided facility (crossover) • Reversible lanes • Ramp closures/relocation • Freeway-to-freeway interchange closures • Night work • Weekend work • Work hour restrictions for peak travel • Pedestrian/bicycle access improvements • Business access improvements • Off-site detours 	<ul style="list-style-type: none"> • Temporary signs <ul style="list-style-type: none"> – Warning – Regulatory – Guide/ information • Channelizing devices • Temporary pavement markings • Arrow panels • Changeable Message Signs (CMS) • Flaggers and uniformed traffic control officers • Temporary traffic signals • Lighting devices • Other safety devices 	<ul style="list-style-type: none"> • Project coordination <ul style="list-style-type: none"> – Coordination with other projects – Utilities coordination – Right-of-way coordination – Coordination with other transportation infrastructure • Contracting strategies <ul style="list-style-type: none"> – Design build – A+B bidding – Incentive/ disincentive clauses – Lane rental • Innovative construction techniques (precast members, rapid cure materials)

* This is intended to be a partial list. A wide range of safety devices are described in part 6 of the Manual on Uniform Traffic Control Devices (MUTCD) and are widely used to enhance safety and mobility in highway work zones.

TABLE H.2: Construction zone Management Strategies by Category, Part II

Transportation Operations (TO)			
Demand Management Strategies	Corridor/Network Management Strategies	Work Zone Safety Management Strategies	Incident Management and Enforcement Strategies
<ul style="list-style-type: none"> • Transit service improvements • Transit incentives • Park-and-ride promotion • Shuttle services • Parking supply management • Variable work hours • Telecommuting 	<ul style="list-style-type: none"> • Signal timing/coordination improvements • Temporary signals • Street/intersection improvements • Turn restrictions • Parking restrictions • Separate truck lanes • Truck/heavy vehicle restrictions • Ramp closures • Bus turnouts • Reversible lanes • Dynamic lane closure system • Railroad crossings controls • Speed limit reduction/variable speed limits • Coordination with adjacent projects 	<ul style="list-style-type: none"> • Changeable Message Signs (CMS) • Temporary traffic signals • Temporary traffic barrier • Crash-cushions • Temporary rumble strips • Intrusion alarms • Warning lights • Construction safety supervisor/inspectors • Project task force/committee • Team meetings • TMP monitor/inspection team • Windshield surveys • Project on-site safety training • Safety awards/incentives • Speed Radar Trailers • Traffic Control Review Team 	<ul style="list-style-type: none"> • ITS for traffic monitoring/management • Surveillance (Closed-Circuit Television (CCTV), loop detectors, lasers, probe vehicles) • Traffic Screens • Total station units • Photogrammetry • Changeable Message Signs (CMS) • Highway Advisory Radio (HAR) • Media briefings • Local detour routes • Transportation Management Center (TMC) • Contract support • Incident/emergency management coordinator • Incident/emergency response plan • Dedicated (paid) police enforcement • Cooperative police enforcement • Increased penalties for construction zone violations